Plants of Prince of Wales Island.

From a MS. in the British Museum.

By Sir William Hunter,

Surgeon to the East Indian Company.

INTRODUCTION.

The author of this manuscript now preserved in the British Museum was Sir William Hunter, Surgeon to the East India Company. He was born in 1755 and was trained for the medical profession. Being appointed doctor to an East Indiaman he started for the East but his ship met with an accident in the Syriam river in Pegu, being dismasted in rough weather. During the delay for repairs Hunter collected materials for his work, "A concise account of the Kingdom of Pegu," which was published in 1785. He became assistant-surgeon to the East India Company in Bengal in 1783, and Surgeon in 1794. From 1798 to 1802, and again later he was Secretary to the Asiatic Society of Bengal. After the capture of Java by the English in 1811 he was appointed Superintendent Surgeon there, and died at Batavia in 1812.

Hunter was a very versatile author, writing papers (chiefly published in the Asiatic researches) on a variety of subjects. Besides the account of Pegu, he published a number of papers on Botanical and Astronomical subjects, an essay on the diseases of Lascars on long voyages, and a Hindustani-English dictionary. He seems to have visited Penang in 1802 or early in 1803 when he wrote this manuscript which has not hitherto been published, and about the same time he must have written his account of Gambier cultivation, which was published in the Transactions of the Linnean Society IX p. 218 and read in England in 1807.

In this manuscript he gives first an account of Penang as it was at the time of his visit and an account of the plants he met with. This interesting as showing the early date of the introduction of many useful plants into Penang through the East Indian Company, who then possessed spice gardens, cultivated for the purpose of introducing spice plantations to the English colonies and to break down the monopoly of the Dutch. In this manuscript we have the records of the first fruiting of the nutmeg and mangosteen in Penang. An account of the cultivation of pepper was published by Hunter in the Asiatic Researches Vol. IX 1809 and is very much the same as what is written by him here, but as the original published paper is rare and difficult to procure now, it is well worth reprinting from his manuscript.

I have identified most of the plants described by Hunter in this paper, but there are several I have been only able to guess at from description. He seems to have made a number of drawings of his plants to which there are references in the manuscript, but I do not know what has become of these drawings.

Reference is made in many parts of the manuscript to the spice gardens of the Honourable East India Company and the locality given for these the first Botanic Gardens in the Straits Settlements is recorded definitely for the first time *viz.* at Ayer Hitam. The stories of these gardens is this. On the settling of the island by Captain Light in 1786, there were practically no cultivated plants there except a few coconuts and fruit trees. The East India Company, anxious to break the Dutch monopoly of spices, appointed Christopher Smith their Botanist in 1794, and sent him in 1796 to the Moluccas to collect plants of spice trees. He sent from Amboyna 71.266 nutmegs and 55.264 clove-plants and quantities of canary nuts (*Canarium commune*), and the sugar palm, *Arenga saccharifera.* These were grown (except for a number sent to Kew, India and the Cape) in the spice-gardens at Penang. He probably sent also the other ornamental and useful plants mentioned as introduced from Amboina. After his return he was appointed in 1806 Superintendent of the Botanic Gardens and died about the same year.

The gardens founded for the Government in 1822, also at Ayer Hitam, were probably on the same spot, but to this we have no clue. A botanical School-master, George Porter had charge of them till 1834 when they were sold cheap by Governor Murchison, as his wife could not get enough potatoes and other vegetables from them for her table, it is said.

Names of plants etc. within brackets (—) are added by myself, otherwise the manuscript is not altered.

H. N. RIDLEY.

To

His Excellency

THE MOST NOBLE

MARQUIS WELLESLEY,

Governor General, &c., &c.

This Outline of a Flora of Prince of Wales Island,

(Penang),

is most respectfully presented,

By
His Lordship's
Most obedient and very humble
servant,

(*Signed*) WM. HUNTER.

Plants of Prince of Wales Island.

Prince of Wales's Island is of a form nearly rectangular, its length from North to South being about eleven or twelve miles, and its breadth, from East to West about half that space. Its North-east point, on which stand George Town and Fort Cornwallis, is in Lat. 5°25′ N. and Long. 100°18′ east. It is divided into an easterly and westerly region, by a ridge of hills, extending through nearly its length. On the highest part of the ridge, is erected a flag-staff, for notifying, by signal, the appearance of ships at sea. The height of this peak, (if it may be called so as the table is about eighty yards in length) has been variously estimated; and all the conjectures I heard on the subject were beyond the truth. To ascertain it, I measured a base of 670 feet, on a plain, as near as could be obtained to the bottom of the hill, which gave the perpendicular height of the highest point 1192 feet. The length of the flag-staff on the hill is fifty feet. This, being viewed from a Bungalow in George Town, through a three foot reflecting telescope, and measured by an object glass micrometer attached to the telescope, was found to subtend an angle of 6′ 54″, giving the distance, in a straight line, about 4⅔ miles.

The table land on the top of the hill runs from North to South. On the North extremity is the flag-staff, and on the South, a Bungalow, belonging to the Lieutenant Governor. There are two roads cut in the side of the mountain, for ascending to the summit, one from the South-ward, and another from the North-ward. The last of these was finished during my stay on the Island. It is something longer than the former, but of much easier ascent; and the bottom of this road being nearer to the town than the other, the whole journey, from town to the top of the hill, is considerably shortended by it. About half way up these two roads unite, so that the upper part is common to both.

The forest trees, by the road-side, have the lower part of their trunks, for above five or six feet above the ground, formed into projecting and re-entering angles, so that a transverse section of one of them would resemble a star. Thence it ascends, round and perfectly straight, without branches, to a great height, perhaps above one hundred feet. The branches at top are pretty much crowded, but that top is small, in proportion to the size of the tree. This form seems to be occasioned by the trees growing so close together that there is not room for the branches to spread wide.

The lofty forest overhead, forming an impenetrable shade, the mountain on one hand, and a rugged precipice on the other, the murmuring of a stream in the valley below, with the song of a few birds, and the perpetual shrill hum of numerous beetles, have a striking effect.

The view from the hill, to the North and South is very extensive over the sea. To the East, it is bounded by a very lofty ridge of mountains on the Malay continent. This ridge is not seen from the plain; being concealed behind a nearer chain, of much less elevation. To the West-ward is a hill, somewhat higher than that whereon the Bungalow and Flag-staff are erected. This intercepts the view of nearly one fourth part of the horizon, that is from N. 65 W. to S. 32 W. So that, if it should be requisite to notify at Fort Cornwallis, the appearance of ships between these points, it must be done by erecting a second flag-staff on the Western hill, the signals on which should be repeated from that to the east-ward.

Immediately to the West-ward of the ridge which joins the Bungalow and flag-staff, is a deep valley to which a kind of road has been formed by cutting the sides of the hill into steps and supporting them with sticks laid across. This valley enjoys a perpetual shade; and at the bottom is a slender stream of very clear and cool water, which running under large masses of rock, is collected in a little bason. The water is hard, from some saline, or mineral impregnation, which I had not the means of examining.

About half a mile farther on, in the valley which contains the beginning of the new road up the hill, is a cascade, formed by a small river, precipitating itself from the mountain. This river winds through the valley, and the road crosses it five times, by means of wooden bridges. The lowest fall is not above twenty feet in height the water limpid as crystal, and always cool. Thence, by a steep and winding ascent, amid thick forest, you come to the foot of the great fall, the height of which has been reckoned two hundred feet, though I suspect this estimate of exaggeration. However, the fall of no despicable stream, from such an elevation, skirted on both sides with most luxuriant foliage, forms an object at once pleasing and sublime. Although the air in the wood, when I first visited it, was exceedingly close; yet on approaching the bottom of the fall, I found it so cold, that I was glad to make a speedy retreat, being apprehensive of bad effects from such a sudden change of temperature when heated. The water is perfectly sweet and well tasted. This river, called the *Waterfall river*, after quitting the valley, takes its course to the South-ward, and joins its stream to another, the *Ayer Hitam* (or black water) which comes from the South-ward. The united trunk, called the *Penang River*, falls into the harbour about two miles to the South-ward of George Town; and from this place, ships are generally supplied with water. But, as far as their boats are able to navigate the river, its water is said to be slightly brackish; on which account, it has been proposed to conduct the purer stream of the Water-fall, by pipes, to George Town for the use of shipping as well as of the inhabitants.

The harbour is formed by the strait, intercepted between the Island and the Malay shore. For capacity and security from tempests, it is hardly inferior to any in the World. But its advantages have been so ably detailed by Sir Home Popham, that I cannot pretend to add anything to the information contained in his report. Whether it is capable of being fortified, so as to be tenable against the temporary superiority of an enemy at sea; and, if so, what are the best means of effecting that purpose, are questions that have undergone much discussion, and still remain unanswered.

The forests produce a great variety of timber for the construction of ships, as well as houses, and for household furniture. I have seen specimens of about thirty different kinds, but was able to ascertain the botanical characters of very few. From their great height, and the larger circumference of the trunk, it is very difficult to climb the large trees, so as to obtain the flowers. These can only be got, either by cutting down the trees, or by tying bamboos along their trunks, to climb upon. Colonel Kyd, in his reports, has given the names of some of the trees, and mentioned the properties of the timber which they yield. But the timber of those trees has yet been seen in most instances to disadvantage, as they have never been allowed time enough to be seasoned.

On the eastern side of the Island, or that part intercepted between the hills and the harbour, almost all the great timber has been cut down; but much ground still remains to be cleared of underwood and planted. The soil is various. In low valleys, nearly surrounded by hills, there is much vegetable mould; on higher spots and extensive plains, we find a stiff red clay, mixed with sand.

The chief article of cultivation is pepper. Large groves of Betel-nut and Cocoa-nut have also been planted, as these trees require but little labour. Almost the only grain raised on the Island, is rice, and that in very small quantity. The price of labour is here, as in all newly settled countries, excessively dear; and therefore crops of small value will not defray the expense of cultivation.

The eastern side of the Island is divided into districts, in the following order commencing from the north.

Poolo-Tikoos; a narrow plain, rather elevated, and open to the sea.

Poolo Penang; extensive plain, containing many plantations of pepper and betel-nut.

Ayer Hitam; a valley, inland, and surrounded on three sides, by hills. In this are situated the Honble. Company's spice plantations. In the parts of this valley which lie near the banks of the river, is some of the richest soil on the Island.

Batoo Lanshun; receives it name from a hill, of no great elevation, close on the shore of the eastern straits; which commands a most interesting prospect of the town, the harbour, and almost the whole eastern plain.

Soongey Groogur; a small district, of very uneven surface.

Soongey Dooa ; In this district, near the shore, is another beautiful hill, the sides of which swell very gently, and the summit has a view of the whole strait, as well as of the adjacent country.

Soongey Neebong ; so named from a kind of palm. The road through this district is difficult, consisting of steep ascents and descents, winding among the hills. In this district is a considerable plantation of Nutmeg and Clove trees, belonging to the estate of the late Mr. Roebuck.

Soongey Clooan ; This district is the richest and most completely cultivated on the Island. It contains the oldest and best Pepper plantations. Here is a large plantation of betel-nut forming on account of the Honourable Company. Opposite to the north-west point of the Island is the small island *Poolo Tikoos* (or Rat Island). It is rocky, almost bare of vegetation, but produces plenty of oysters.

Within the straits are the islands Poolo Juraja and Poolo Kra; and at the southern extremity lies Poolo-Remoo, or Tiger Island. All these are woody. On Poolo Juraja is found good lime-stone, and a reddish clay, which being mixed with sand, and spread on the roads, forms an excellent hard surface.

The climate, as might be expected so near the equator, admits of little variety of seasons, in respect to heat and cold. And these depend, not so much on the meridian zenith distance of the sun, as on the variety of dry or rainy weather. The following abstract of a register of the thermometer for ten months, will show the extent of its variations.

	MORNING		NOON		EVENING	
	from	to	from	to	from	to
April	80	84	80	87	80	86
May	79	83	80	86	80	84
June	80	83	80	86	80	84
July	79	83	81	86	80	84
August	77	82	79	85	78	83
September	78	82	78	84	78	84
October	78	81	78	84	78	82
November	76	80	78	84	78	81

	Morning		Noon		Evening	
	from	to	from	to	from	to
December	75	80	80	86	76	82
January	75	78	85	91	77	82

In the months of September, October and November was much heavy rain. From the middle of December, to the beginning or middle of March, is the driest Season. The heat in the middle of the day then rises high, but the nights and mornings are cool. During the remaining six months, frequent showers fall, which cool the air, but there is no heavy or long continued rain. In clear weather, the morning from a little after sun-rise, till ten or eleven o'clock, is usually sultry: but about that time, the sea breeze sets in, to temperate the heat, and restore the elasticity of the atmosphere. And it is remarked that exposure to the sun after that hour, is less hurtful than before.

The temperature on the top of the hill is at all times about ten degrees lower than that on the plain. Hence, during the dry season, convalescents derive great benefit from a residence on the hill; the journey to which from the Town, may be performed in one hour and three quarters. But in rainy weather the hill is frequently enveloped in a thick fog, which is hurtful to invalids. A fog is hardly ever known to reach the point on which the Town is built.

For some years after his Island was ceded to the English Government, during the process of cutting down the woods and clearing the ground, the place was found to be unhealthy. Fever and dysentery, with obstructions of the liver and spleen were prevalent and often fatal. But at present, there is probably no Settlement in India where Europeans enjoy better health, or can endure with impunity more exposure to the vicissitudes of the weather.

The number of inhabitants may be safely estimated at 20,000. Of these at least one third are Chinese, who are divided into two classes. Those from the province of Canton are chiefly artificers, and the people from Chin-chew are employed in the cultivation of the ground. These two classes cannot understand each other's language and an antipathy prevails between them, as great as between the natives of two hostile kingdoms.

The *Choolias*, a race of musulmans from the Southern part of the Coromandel Coast (above Nagore especially) may be reckoned to form another third. Many of these are engaged in trade; the boatmen, fishermen, and coolies, who carry burdens are all of this class.

The remaining third is chiefly composed of Europeans, Armenians, Portuguese Malays and Burmas. The concourse of various nations is so great, that I have been assured that fourteen languages are in constant use in the Bazaar; English, Portuguese, Armenian, Chinese of Canton. Chinese of Chinchew, Buzguese Malay, Siamese, Hindostanee, Bengalee, Tamil, Telinga, Arabic, Burma.

The vegetable productions which have fallen under my observation are as follows :—

MONANDRIA—MONOGYNIA.

Canna Indica-cultivated in gardens.

1. *Amomum zingiber*, Ginger, Alia, Malay.

Cultivated, nearly sufficient for the use of the inhabitants.

2. *Amomum globosum ?* Loureiro Flor. Cochinchin, p. 4. *Amomum nutans*, Roxb. [*Alpinia* sp. Ed.]

Spike: cauline, branched; fruit globose, with an even suface. Boonga Chungkenam, Malay.

Description.

Root: tuberous, fibrous. Stems: erect, cylindrical, smooth, porous, lamellated. Leaves: alternate, lanceolate, large, smooth, without nerves. Petioles: long, vaginant, continued large, from the lamella of the stem. Stipule: a membranaceous margin, toothed at the apex of each petiole within the base of the leaf Racemi of Flowers: terminating the stem drooping. Peduncles: sparse; the lower three flowered, the upper two flowered. Calyx: Perianth above, one leafed;

mouth three toothed. Corol: One petaloid, funnel shape, irregular; tube dilated at the throat, declining. Limb three parted, with divisions ovate, twice as long as the calyx, white; the upper larger. Nectary, one leafed, petal form, trapeziform, concave, declining; the length of the Corol; without of a whitish yellow; within yellow with scarlet spots: arising from the throat of the tube together with the lower division of the Corol. Stam: Filament one, broad, inside plain, three furrowed, outside convex, smooth; erect, shorter by one half than the Corol; arising from the throat of the tube, together with the upper division of the Corol. Anther oblong, erect, inside deeply furrowed; emarginate. Pist: Germ below, globular, tomentose, crowned with a glandular corpuscle, which is cylindrical and furrowed towards the upper division of the Corol. Style thread form, longer than the stamen; embraced by the furrow of the Anther. Stigma funnel form, with an ovate mouth.

I have not seen the fruit, but judge it to be the same with Loureiros' plant, from the agreement of the other parts. The infusion of the root is used by the Malays as a stomachic.

3. *Amomum filiforme*, H. (*Hedychium coronarium*, L.).

Spec. Diff. Stem two edged; spike terminal, oblong, nodding; scales spathulate, two flowered; leaves lanceolate, most entire, smooth.

Description.

Stem: herbaceous, two feet in height, erect, two edged, smooth, porous, lamellated, formed of the petioles of the leaves, vaginant, equitant. Leaves: alternate, lanceolate, most entire, smooth, without nerves, stipule: a membranaceous margin, at the apex of each petiole, within the base of the leaf. Spikes terminal, oblong, nodding. Flowers in pairs, sessile, white, sweet-smelling. Calyx spathe (or scale) spatulate, rolled up into a cylinder, two flowered; the flowers spreading successively. Proper perianth tubular, splitting at the side, mouth three toothed, with toothlets lanced. Cor: one petaled; Tube three times as long as the calyx, thread form, erect, a little reflected, limb six cleft; the upper division large, roundest emarginate;

the two lateral obliquely ovate, the three alternate, outer, linear; all spreading. Stam: filament one, linear, below convex, above channelled, ascending, a little longer than the corol; arising from the throat of the tube, at the base of the lower division. Anther oblong, erect, channelled above, with a double pollen bearing line. Pist: Germ below, obtusely three cornered; crowned with a gland, conical, two cleft, style capillary arising at the base of the gland, towards the lower side; concealed within a furrow in the lower side of the tube and of the stamen. Stigma funnel shape, very small, at the tip of the anther.

I have not seen the ripe fruit, and believe it does not bring its seed to perfection at Prince of Wales's Island. It is cultivated in gardens for the beauty and perfume of its flowers.

According to Dr. Roxburgh's arrangement of the scitamineous plants, this will be a *Koempferia*, and approaches very near to, if it be not the same with his *Koempferia speciosa*. *Gandsulium*, Rumph. 5, t. 69, f. 3. *Hedychium coronarium*, Koen. ap. Retz. Fasc. 3, No. 20, p. 73, Willden p. 10.

In mine the tube of the corol is longer and more slender; and the divisions of its exterior limb are linear.

4. *Amomum taraca*, Roxb.

"Leaves sub-petioled, oblong; panicle terminal; interior division of the corol two lobed, with lobes emarginate and curled." *Hellenia allughas,* Willden p. 4. *Heritiera allughas*, Retz. obs. fasc. 6, p. 17, t. 1. This is also called by the Malays Ghungkenam. The fruit very hot and fiery. The root pounded is applied as a remedy in Tinea capitis.

CURCUMA.

C. longa, Turmeric. Mal. Koonhut. Cultivated.

DIANDRIA—MONOGYNIA.

ERANTHEMUM.

Leaves: in threes round the stem, lanceolate, smooth, spikes verticelled, axillary and terminal; verticles three flowered.

Corol: two lipped, three and two cleft. Anthers: double; two small barren stamens between the fertile ones. It agrees with the *Eranthemum diantherum* of Dr. Roxburgh in everything except the three fold leaves which may be an accidental luxuriancy.

JUSTICIA.

1. *J. picta*, Tsjude-maram. Hort. Mal. 6, t. 60. Folium bracteatum, Rumph. 4, p. 73, t. 30. (*Graptophyllum hortense* Nees.).

Cultivated; a variety has the leaves of dark brown, not variegated.

2. *J. involucrata*, Roxb. Cultivated in a Garden.

TRIGYNIA.

PIPER.

1. *P. nigrum*, Black pepper.

Leaves ovate, acuminate, 5 to 7 nerved, smooth; petioles short. Melago codi. Hort. Mal. 7, p. 23, t. 12. Marsden's Sumatra p. 105. Malay: Ladda.

This plant has been so fully described, that I have nothing to add on that head. But as it is the most important article of produce on Prince of Wales's Island, the manner of cultivation pursued there merits a particular detail.

It is propagated by cutting, or suckers. These are generally planted at a distance of about 7½ feet; that is 1,000 plants in an Oorlong, which is a measure of 80 yards square, nearly equal to 1⅓ acre. But some experienced cultivators think that the distance should be greater; perhaps nine feet; as the roots would be better nourished and the produce more abundant.

When a plantation is to be commenced, the large timber is cut down by Malays, at the rate of five dollars per Oorlong. The remaining labour is performed by Chinese, who dig out the roots, burn them and the trunks, pulverise and level the soil, plant the pepper vines and the trees which are to support them. It is usual to contract with them for making the plantation in this manner, and taking care of it for three years, at the end of which time it is in bearing at the rate of 225 dollars for 1,000 plants. The sum is liquidated by instalments, as the contract requires it, to pay his workmen. Something more than one third is paid in the first year, because the labour is then greatest; but about one fourth of the whole is generally reserved, till the contract is completed, and the plantation delivered over. This does not include the price of the plants, or cuttings, which are found by the proprietor of the plantation.

The vine is first made to climb on a pole. At the end of ten or twelve months, it is detached from the pole, to undergo the process called laying down. A circular hole, about eighteen inches in diameter, is dug at one side of the plant. At the bottom of this the plant is carried round in a circle, and the end of it is brought to the tree which is in future to form its support. The depth of the hole, in which the vines are laid down, varies, according to the situation and nature of the soil; and much judgment, to be acquired by practice, is requisite, to adapt it to these circumstances. In high and dry situations, the depth must be considerably greater than in those which are low and moist. Too little depth in the former would expose the roots to be parched in dry seasons; and too much in the latter would occasion them to rot, from excess of moisture.

The trees used for supporting the pepper vines on Prince of Wales's Island are the *Morinda citrifolia* (Munkoodu) and the *Erythrina corallodendron* (Dudup). The Chinese planters alledge that the pepper supported by the Erythrina thrives better, and lasts longer than that supported by the Morinda. One instance I heard quoted in proof of this assertion, was a plantation which had long been neglected, and overgrown with weeds. When it came to be examined the vines which had grown on the Morinda were all dead; while those on the Erythrina were still strong and productive. The reason assigned by the planters, for the difference is, that the roots of the Erythrina do not spread so much, or penetrate so deep as those of the Morinda; whence they interfere less with the pepper, and do not draw so much nourishment from the earth.

The Morinda was formerly made to grow with one stem, but this was not found to afford sufficient spread for the vines. Therefore when that tree is used, the practice now is to break off the principal stem, at a height of about two feet from the ground. This obliges the trees to put out lateral branches at that height. When these have attained a length of about a foot or fifteen inches, they are cut off. From their end arise erect shoots each of which forms a stem, so that the vine has four or five stems to climb on, instead of one.

The vines, at three years of age, begin to produce, and they are reckoned to be in full bearing at five or six. They continue nearly in the same state for eight years more, or till they are fourteen years old. From that period they are reckoned on the decline; but the planters on Prince of Wales's Island cannot yet judge from experience at what rate, or in how long a time they decay. Some Chinese, who have cultivated the plant, on the Malay coast, say the vines have not arrived at their point of greatest produce till they are fourteen years old; that from this gradually declining, they continue bearing till near thirty.

The first year of bearing, or at three years old, the vines do not yield more than half a catty each. But plants kept in good order, when in their prime, will produce three catties. A plantation of 3,000 vines at *Soongey Clooan*, now in its eleventh year, has been let for three years at seventy picols yearly, or at the rate of 2⅓ catties each plant. It must therefore produce as much more as will pay the tenant for his labour and risk. They are generally let for the first five years of bearing, or from three to eight years old, at 160 picol per Lukcha (10,000) or at 160 catties for 100 vines.

The vines yield two crops yearly. The first gathering commences inDecember, after the heavy rains are over; and at the same time, the vines have put out new flowers. This first collection may be finished in February. The flowers which spread in December have ripened their seeds in April or May. The second collection then begins, and ends in July.

During this time blossoms have expanded, which are to furnish the crops of next December. But, with the most careful cultivators, who gather only the bunches which are fully ripe, these two harvests run so nearly into one another, that the collection is in a manner continued without interruption, from December till August; so that there is only an interval of four months in the year, which is the season of the heavy rains.

The bunches are plucked off entire, taking care to pull only those that are ripe. They are thrown into baskets, and allowed to remain for a day. Then they are spread on mats, and trodden with the feet, to separate the fruit from the stalk. The grain is then winnowed, to clear it from the stalks and the lighter grains; and then the good heavy grains are spread on mats, in the sun, to dry, for three days. It is calculated that one hundred catties of green pepper, with the stalks, yield thirty five catties of clean and dry pepper. The collection of one day from 46,000 plants of three years old, was 500 catties of green, or 175 of dry pepper.

It is usual, as was before noticed, when the plantation is delivered over to the proprietors at the end of three years, to let it to a Chinese farmer for five years more; as the proprietor is thereby less liable to imposition, the only precaution necessary being to see that the tenant is careful of the vines during the last year, and leaves them in good condition at the expiration of the lease. This is the only way in which an extensive plantation, or one whereon the proprietor cannot bestow his whole attention, can be managed to advantage. But, if the proprietor has time, and is careful and acute, he may render it something more productive, by keeping it in his own hands. The labour of cleaning the vines, throwing up earth about the roots, and collecting the produce of the plantation above mentioned, of 46,000 plants, was performed by sixteen Chinese workmen.

In an Appendix to a letter from the Superintendent of Prince of Wales's Island, dated 12th of November 1796, is an estimate, whereby it would appear that a plantation of 100,000 vines should yield, at the end of twelve years, a clear profit to the proprietor, of 153,000 Spanish dollars. But the value of the pepper is stated too high at 14 dollars per picol; and the interest of money, on both sides of the account, is neglected. Yet if we value the pepper only at ten dollars for which it is presumed it may always be sold on the field, and compute the interest, the result will give an advantage, exceeding the Superintendent's calculation, by 31,000 dollars. See Appendix A.

The whole quantity of pepper produced last year on the Island, was estimated at something between sixteen and twenty thousand picols. Taking the medium quantity at 12 dollars, which was the selling price, this article must have amounted to 2,16,000 dollars. The pepper is more esteemed than that which comes from the Malay continent and Sumatra, and it sells for about one dollar more per picol. The difference is occasioned by the haste of the Malays to gather the fruit before it is sufficiently ripe.

APPENDIX A.

Estimated expense and produce in 12 years, of 100 Oorlongs, planted with Pepper.

	DR.	CR.	BALLANCE.
	Sp. Drs. Pa.	Sp. Drs. P.	Sp. Drs. P.
1st Year, Clearing of heavy timber by Malays at 5 Drs. Oorlong	500		
To the Chinese contractor, in the course of 3 years, when he engages to deliver the Plantation in full bearing, @ $22.50 per 1000 plants ... $22,500.00			
Of this in the first year 8437.50	8437.50		8,937.50 Dr.

2nd Year, Farther payment to contr. ...	4218.75	4218.75		
Interest of 1st year at 12%		1072.50		14,278.75 Dr.
3rd Year, in full to contract ...	9843.75	9843.75		
	$22,500.00			
Interest in the 3rd Year ...		1707.45		25,779.95 Dr.
4th Year, Interest ...		3093.59		
Supposing the Plantation to be let, during the first 5 years of bearing, at 160 Picols per Lacsha, this will be 1600 Picols; which may be sold on the ground at 10 Drs.			16,000	12,873.54 Dr.
5th Year, Interest ...		1544.82		
5th Year's crop ...			16,000	1,581.64 Cr.
6th Year's Interest ...		...	189.80	
6th Year's crop ...		...	16,000	17,771.44 Cr.
7th Year, Interest ...		...	2,132.57	
7th Year's crop ...		...	16,000	35,904.01 Cr.
8th Year, Interest ...		...	4,308.48	
8th Year's crop ...		...	16,000	56,212.49 Cr.
9th Year, Interest ...		...	6,745.50	
The plants being now in full vigour, may be let for four years more at 2 Catties each plant, or 2000 Picols; which is		...	20,000	82,957.99 Cr.

10th Year, Interest	9,954.96	
10th Year's crop	20,000	112,912.95 Cr.
11th Year, Interest	13,549.55	
11th Year's crop	20,000	146,462.50 Cr.
12th Year, Interest	17,575.50	
12th Year's crop	20,000	184,038.00 Cr.

2. *Piper betle.*

Leaves obliquely cordate, acuminate, waving, seven-nerved, smooth. Willden p. 15. Betela-codi Hort. Mal. 7, p. 29, t. 25. Mal. Seeree.

Of this the Malays reckon five varieties, among which are these three, Seeree Malayo, Seeree Cheena, Seeree Oodang. The specimen of which the leaf is above described was the Seeree Cheena. The Seeree Oodang, they say has the petioles and nerves red.

Cultivated, but in no great quantity. A larger quantity is imported from the neighbouring coast.

3. *P. siriboa.* Willden p. 161. Siriboa, Rumph 5, p. 340, t. 117, f. 2. Mal. Bakee.

The fruit is nearly as long as a finger, and tastes like the Betel leaf. It is used as a substitute for it, especially at sea, where the fresh leaves of Betel cannot be procured. (No doubt "Bakek" *Piper miniatum* Bl. is intended).

4. *P. chaba*, H.

Leaves, alternate, petioled, lance-ovate, oblique at the base, with veins opposite. Spikes: leaf-opposed, peduncled, sub-cylindric, compact. Piper Longum. Tsjabe Rumph: 5, p. 333, t. 16, f. 1. Mal. Chabatadee.

Cultivated and used as long pepper, but a very distinct species from the Malabar or Bengal long pepper.

5. *P. latifolium?* (*Piper longum* L.).

Fruit: like the former. Leaves: alternate, deeply cordate, obtuse, nine nerved. Mal. Gadoo or Gadookh. The leaves are used as a pot herb.

TRIANDRIA—DIGYNIA.

SACCHARUM.

1. *S. officinarum*, Sugar-cane. Mal. Toboo.

Cultivated very successfully, and yields abundance of good sugar. Manufactories of it were undertaken, but have been deserted on account of the excessive price of labour.

2. *S. cylindricum*, Willden 323. Lamarck. Encyclop. 1, p. 588, t. 40, f. 2. *S. Koenigii*, Retz. obs. fasc. 5, p. 16, N. 28. *Gramen caricosum*, Rumph. p. 6, 17, t. 7, f. 2, A.

Root: creeping, jointed at the distance of an inch. Stalks cespitose, jointed; joints bearded. Panicle spiked, cylindrical, pedicels three flowered. Malay Lalang.

This grass springs up abundantly, in rich ground, which has been cleared of the large timber, and afterwards neglected. It then becomes the greatest obstacle to the labour of the cultivator. Its habit and history are well delineated by Rumphius.

ARUNDO.

A. trivalvis, H.

Calyx three valved, three or four flowered. Stalks tall (10 or 12 feet) piped, knotted. Leaves alternate, bifarious, very long and narrow; petioles vaginating, half the length of the joints, villous at the origin of the leaf. Panicle terminal, diffuse, large. Pedicels very slender, flowers minute. Calyx Glume three or four flowered; three valved, valves alternate, lanceolate, the inner one longer. Cor: Glume, two valved, valves lanceolate; concave; the outer longer, firmer, woolly at the base and along the margin. Nect. Two scales, obovate membranous, very small. Stamina and Pistillum as in the genus. Growing abundantly on the side of a hill near Soongey Clooan. (Probably *Neyraudia madagascariensis*).

TETRANDRIA—MONOGYNIA.

IXORA.

1. *Ixora malaica*, H. (Apparently *I. congesta* Roxb.).

Sp. Diff. Shrubby, erect; Leaves short petioled, oblong ovate, pointed, corymbs terminal; teeth of the calyx obsolete. Anthers bristle pointed.

Stam: shrubby, erect. Leaves: opposite, petioled, large, oblong ovate, pointed, most entire, smooth. Petioles: short, spreading. Flowers: in terminal corymbi; of a deep orange. Teeth of the calyx: obsolete. Divisions of the Corol: very obtuse. Anthers terminated with a bristle like point. Stigma: two lobed. Found near the waterfall, and in the sides of the hill.

2. *I. lanceolata*, H. (*I. lobbiana* Hook.?).

Sp. Diff. Shrubby, leaves short petioled, lanceolate pointed corymbs terminal, trichotomous; teeth of the calyx and segments of the corolla pointed; anthers bristle pointed.

Stam: shrubby. Leaves: opposite, decussated, lanceolate, pointed, most entire, smooth. Petioles short, spreading. Flowers orange in corymbs terminal, trichotomous throughout, compact. Calyx teeth pointed. Corolla segments pointed. Filaments short, very slender; anthers incumbent, terminated with a bristle like point. Found on the hill half way up.

3. *I. cuneata*, H. (*I. arguta* Br.).

Sp. Diff. leaves wedge form, pointed, half stem clasping, villous below; corymbs terminal, compact; segments of the calyx and corolla acute villous.

Stam: shrubby; branchlets pubescent. Leaves opposite, decussated, sessile, almost stem clasping wedge form, pointed, most entire, rough, below villous. Flowers white, very slender, very numerous, in terminal compact corymbi. Bracts two to each flower, lance-linear, sharp, villous. Calyx villous, deeply four cleft, divisions sharp, erect. Segments of the corolla sharp, villous below. Found near the waterfall.

CALLICARPA.

Callicarpa dentata, Roxb. (*C. cana* L.).

"Shrubby, downy; leaves ovate-cordate and elliptic, acutely dentate, serrate wrinkled, very downy underneath; panicles axillary. Sub-globular, dichotomous, a little longer than the petioles, calyx woolly, four toothed, stigma bifid, berries purple." *Callicarpa americana* Loureiro p. 88? Grows plentifully in the forests near the bottom of the hill.

PENTANDRIA—MONOGYNIA.

PLUMBAGO.

Plumbago rosea. Cultivated in gardens.

IPOMEA.

I. pes-caprae, Convolvulus grows plentifully in sandy-soil near the sea.

NAUCLEA.

1. *Nauclea gambeer*, H. (*Uncaria Gambir* Roxb.).

Climbing; branches round; leaves ovate, pointed, smooth; stipules two, lateral, falling; peduncels axillary, solitary, simple, jointed. Stem: shrubby; climbing to a great height, covered with a rough brown bark, branches crowded, round, smooth; branchlets opposite, widely spreading. Leaves opposite, petioled, ovate pointed, waving, widely spreading, smooth, below marked with transverse parallel veins. Stipules at the bases of the branchlets and petioles, two, lateral, parabolical, sessile, widely spreading, smooth, falling. Peduncles axillary, solitary, round, straight, horizontal, much shorter than the leaves; jointed near the apex and bracted; after the flowers have fallen the lower joint persistent, recurved, forming a hooked spine. Bracts four, ovate, acute, spreading, very small, falling.

Flower aggregate, globular; composed of very numerous florets, crowded on a globular, naked very small receptacle. Calyx perianth common, none proper one leafed, oblong, incrusting the germ, persistent, mouth five cleft, divisions lanced erect. Corolla as in the genus. Stam. Filaments five, very short; anthers oblong, capsule pedicelled, oblong, encrusted and crowned with the calyx; tapering to a point below, two celled, two valved; the valves adhering at the apex, splitting at the sides. Seeds very numerous, oblong, very small, compressed, furnished at both ends with a membranous pappus.

The flowers full spread I suppose last a very short time; for although I have frequently looked for them, I was never able to find them.

From the leaves of this shrub is prepared a substance called Gambeer, which is used by the inhabitants of the eastern coasts and islands to chew along with the leaves of Betel in the same manner as Kut (Succus japonicus of the shops), in other parts of India. The modes of preparation are two. The first is by boiling the leaves. See Marsden's Sumatra p. 243, where he quotes for a particular account of the manufacture, the second volume of the Transactions of the Batavian Society. This process was performed under my inspection by a Chinese of Prince of Wales's Island.

Seven catties (or 9⅓ lbs.) of the leaves, plucked clean from the stalks, were boiled, in a large pot, for one hour and a half, adding more water, as the first wasted, till towards the end of the process, when it was inspissated to the consistence of a very thin sirup. When taken off the fire, and allowed to cool, it became solid. It was then cut into little squares, which were dried in the sun, turning them frequently. After one month, I weighed them, and found ten ounces and two drachms, troy weight.

The Gambeer prepared according to this process is of a brown colour, but from some parts of the Malay coast, and of Sumatra, it is brought in little round cakes, almost perfectly white. According to Dr. Campbell of Bencoolen, this is made by cutting small the leaves and young twigs, and infusing them in water for some hours; when a foecula is deposited, which is inspissated by the heat of the sun; and moulded into round cakes.

The Gambeer, when first tasted, impresses on the palate a strong sensation of bitter and astringency. But it afterwards leaves a sweetish taste, which remains a long time. From these sensible qualities, it may reasonably be expected to prove useful in medicine.

A plantation of this shrub, and a manufacture for this drug, was set on foot, some years ago, by a Chinese near Batoo-Lanshun. But he found the same obstacle to this, that has proved fatal to most other manufactures hitherto attempted on the island. The pay of his workmen came so high, that the drug cost him more than the market price of that which is imported. He has therefore rooted out the plants, and put pepper vines in their place.

From the sensible qualities of the Gambeer, it appears likely to yield a considerable quantity of tanning substance, which has lately been the subject of inquiry from the Honourable the Court of Directors, respecting the Kut, or Cutch. And, some rough trials which I have made on it, with animal gluten, compared with those of Dr. Roxburgh on Kut, evince it to be richer in that material than the Kut.

Not having found the flowers expanded, I was unable to give that most essential part in my drawing; but the deficiency has been supplied by the favour of Dr. Roxburgh from a drawing transmitted to him by Dr. Berry of Madras.

2. *Nauclea acida*, H.

Climbing; branches four cornered, smooth; Leaves ovate, pointed, smooth; Stipules four, pointed; Peduncles axillary, solitary, simple, jointed, bracted, recurved after flowering, persistent.

Perhaps *N. aculeata*, Willden 929. *Uncaria aculeata.* Willden Uster, Delect. 2, p. 200. *Uncaria* Gen. Pl. ed. Schreb. n. 311. *Ourouparia guianensis* Aubl. gui. 1, p. 177, t. 68. The leaves have an acid taste. Found at Soongey Clooan.

3. *Nauclea sclerophylla*, H.

Climbing, branches four cornered, pubescent; Leaves elliptic, short pointed, rigid rough below. Stipules two, lateral, lunate, two lobed; Peduncles axillary, solitary, simple, jointed, bracted, recurved after flowering, persistent.

Stam: shrubby, climbing. Branches opposite, brachiate, four cornered, four furrowed, pubescent, spreading. Leaves: large, opposite, decussated, elliptical, short pointed, waving, rigid; above, smooth; below pubescent nerved, reticulated. petioles short, cylindrical, pubescent, spreading. Stipules two, lateral, lunate, two lobed, horizontal. Peduncles axillary, solitary, compressed, spreading, a little recurved, pubescent, twice the length of the petioles, near the apex jointed and bracted; after the seeds have fallen, more recurved, and sharp like thorns. Bracts six, lanceolate, verticelled, at the joint of the peduncle. Calyx common none Proper perianth continued above the germ, funnel form, pubescent without; five cleft, with segments lanceolate, erect. Corolla funnel shape; tube twice as long as the calyx, dilated above, villous without, segments of the limb ovate, obtuse. Stam filaments very small, in the throat of the tube; Anthers lunulate, bifid at the base, incumbent. Pist: Germ ovate, easily split into two when the calyx is removed; stigma ovate. Found on the top of the hill.

MORINDA.

Morinda citrifolia, *Bancudus latifolia*, Rumph 3, p. 158, t. 99. *Coda pilava* H. M. 1, p. 97, t. 52. Tagaroo of the Circar Hindoos. Roxb. Aal in Malaya; Atchy in Oude. Hunter in As. Res. 4, p. 37. Muncooda Malay at P. of W. Island.

This tree is cultivated (as noticed before) to support the pepper vines. If the prejudice entertained by the Chinese planters, against it, should prove to be illfounded, it would be a more profitable tree than the Erythrina, because its roots furnish a valuable dyeing substance.

MUSSOENDA.

Mussoenda frondosa.

Growing abundantly all over the woods, both on the hill and the plain.

ATROPA.

1. *Atropa trichotoma*, H.

Stam: arboreous panicles terminal, trichotomous, divaricate; leaves obovate, crowded. Tree middle sized, erect. Branches verticelled, horizontal, covered with a rough muricated bark. Leaves: towards the extremities of the branches, crowded, opposite, decussated, sessile, stem clasping, obovate, large 17″ long, 14″ broad most entire; smooth; with a middle rib thick, three cornered nerves spreading parallel. Peduncles terminal, trichotomous, forming a divaricating panicle; common peduncle cylindrical, thick; lateral ones opposite, decussated, horizontal; again twice trichotomous: proper pedicels very short. Flowers large, within white, without yellowish. Calyx one leafed, five cleft; segments ovate, erect, closely embracing the base of the corrolla; when the fruit ripens, spreading, withering. Corolla one petaled, funnel shape, tube cylindrical, short, limb bellied, five cleft, segments ovate, blunt, equal, reflected. Stam: filaments five, arched, declining, awl-shape, rising from the throat of the tube, nearly as long as the corolla, anthers arrow form, versatile. Pist: Germen above, oblong, smooth, style thread form, erect, the length of the stamina, stigma headed. Per: Berry oblong, smooth, sitting on the calyx, two celled, with a receptacle fleshy, convex on both sides, kidney shape. Seeds, very numerous, small, kidney shape.

I have placed this under the genus Atropa from the structure of the fruit; but it differs by having the stamina declining and not divergent.

I do not know whether the tree is indigenous at Prince of Wales's Island. The only one I saw, grew in the area of a house, belonging to a Chinese in George Town. It is said to grow abundantly at Acheen, and to be used as a topical application to limbs afflicted with chronic pains. The whole plant has a disagreeable heavy smell, and sitting in a room with a branch of it is apt to give a headache.

2. *Atropa ? virgata*, H.

Stem shrubby, wand like; spikes terminal interrupted; Flowers sub-sessile, crowded leaves oblong. Stems several from one root, shrubby, wand like, jointed, cylindrical, smooth. Leaves opposite, oblong-oval, pointed, most entire smooth; (length one foot, breadth five inches). Spike terminal, interrupted. Flowers large, of a cream colour; sub-sessile, crowded. Calyx Perianthium small, one leafed, pitcher form, five cleft; segments ovate, obtuse connivent. Corolla one petaled, funnel shape, tube cylindric, limb bellied, five cleft, segments ovate, obtuse, nearly equal. Stam: filaments five, arched, declining; rising from the throat of the tube, longer than the corolla, anthers arrow form, versatile. Pist: Germen ovate, smooth, style, awl-form, erect, a little shorter than the stamina; stigma orbiculate, depressed. Germ: two celled, with receptacles kidney shape, rudiments of the seeds numerous.

Not having found the fruit I could not positively ascertain the genus; but have placed it here from the structure of the germ, and the similarity of the flower to that last described. It is a very handsome shrub growing in the woods.

(I cannot guess what either of these are).

SOLANUM.

Solanum indicum.

Growing in vallies near to water courses, in the hills.

IGNATIA.

Ignatia amara ? (*Strychnos* probably *Tieute* Bl.).

This tree I did not see, but found on the road up the hill, at the foot of some tall trees, a fruit which I take to be that of the Ignatia.

Berry globular, covered with a woody, brittle shell, with a mucous pulp. Seeds about four, oblong, convex without, angular within, very hard, covered with a thin cuticle. These seeds exactly resembled the beans of St. Ignatius, and had the same bitter taste.

ARDISIA.

1. *Ardisia umbellata*, H.

Shrubby; Leaves obovate, most entire, smooth; umbels axillary and terminal, simple. Stem shrubby, erect. Branches scattered, stiff and straight, shorter towards the top of the stem, forming a conical head. Leaves scattered, petioled, obovate, most entire, smooth. Petioles very short, spreading, flat above. Peduncles axillary and terminal, round spreading; shorter than the leaves, umbelled. Umbel with rays about six, of the structure of the peduncle. Flowers small, purple. Calyx segments ovate, obtuse, erect. Corolla segments lance-ovate, sharp. Berry globular, smooth, black. Seed roundish, covered with a brittle striated shell.

2. *Ardisia nutans*, Roxb. (Prob. *A. crenata* Roxb.).

Leaves lanceolate, crenate. Racemes terminal. Flowers drooping. Stem shrubby. Leaves alternate, lanced, acute; obscurely crenated, smooth. Racemes terminal. Flowers many, small, of a dilute rose colour, drooping. Calyx segments, lanced, erect. Corolla segments ovate, acute. Berry roundish, smooth; scarlet colour. Seed globular, covered with a brittle striated shell (or aril)?

Is it the same with *Pyrgus racemosa* of Loureiro (p. 148)? Willdenow remarks that the generic character of that plant agrees with Bladhia, except the arilled seed. Now both this and the last species have a thin brittle aril. May not the genera Ardisia and Bladhia be united? Found in the valley, near the waterfall and on the top of the hill. Was in flower in May, and again in December.

N.B. The germ dissected contained the rudiments of eight seeds.

TECTONA.

Tectona grandis.

Teak tree. A few trees cultivated in the Honourable Company's spice plantation. Brought from Java.

MANGIFERA.

1. *Mangifera indica,* Willden p. 1150.

Leaves oblong lanceolate, (panicles terminal R.) flowers sub monandrous; drupe very large, kidney form. Willd. and Roxb. Cultivated.

2. *Mangifera foetida,* Lour. ed. Willd. p. 199.

Racemes, elongate, petals entirely reflected; drupe cordate, pubescent. Lour. Manga foetida. Rumph. 1. 1. cap. 23 tab. 28. Tree large, with divergent branches. Leaves sparse, oblong, most entire, smooth; below with parallel nerves (length eight inches, breadth two). Petioles ascending, thicker at the base (one or one and half inch in length). Panicles terminal, composed of racemes sparse, spreading: peduncles in threes, very short, again bifid, proper pedicles very small. The whole panicle red. Bracts two, scale like, very small, at the base of each pedicel. Calyx perianth five leafed; leaflets ovate, acute, concave, erect of a scarlet colour. Corolla petals five, lanceolate, acute, reflected from the base sessile; yellow at the base, rose colour in the centre, whitish at the margin and apex. Stam filaments five, awl-shape, unequal, erect, connected at the base; anthers oblong, erect. Pist: Germ globose, smooth; style thread form erect, the length of the stamina; stigma simple obtuse. Drupe heart shape; not hairy. Cultivated. Mal. Bachang, or Machang.

In some flowers one fifth part of the number is wanting in the Calyx, Corolla and Stamina. In others I found only a rudiment of the Pistillum. These are probably male flowers.

The flowers have hardly any smell; and the leaves, when bruised, exhale a faint herbaceous odour, not the resinous smell described by Rumphius. Perhaps it is the variety called Wani, by Rumphius, which he says is less foetid, the fruit longer, more pointed, and safer to eat that the foetid. I did not hear that the natives ascribe to the fruit of this any noxious quality.

Loureiro's specific difference seems insufficient; I would alter it thus; Leaves oblong; panicles terminal; Stamina five, fertile, connected at the base; drupe cordate.

LEEA.

1. *Leea staphylea*, Roxb. Found at Soongey Clooan. (*Leea sambucina* Willd.).

CARISSA.

Carissa carandas. Cultivated.

CERBERA.

Cerbera salutaris ? Loureiro ed. Willd. p. 168.

Leaves oblong oval, scattered; corymbs terminal. Segments of the calyx cuneate, pointed. Stam: a tree, middle sized, branches spreading. Leaves scattered, crowded towards the ends of the branches; petiolate, oblong oval, most entire, glossy. Petioles short, wide spreading, smooth. No Stipules nor Bracts. Flowers large (but smaller than those of the Cerbera Manghas) white. Calyx, perianth five leaved, deciduous; leaflets cuneate pointed, spreading. Corolla one petaled, salver shape, contorted tube cylindrical, dilated at the throat, five furrowed, limb, five parted, segments obovate, oblique, one side more gibbous, wide spreading. Five scales, lanceolate, ciliated from the clefts of the corol, horizontally converging, shutting the throat of the tube. Stam: filaments five, adnate to the tube of the corol, opposite to the furrows; below evanescent, above broader, compressed, shedding a fluid from a triangular papilla, a little below their apices, anthers cordate, furrowed, converging, covered by the scales of the corolla. Pist: Germ roundish, two furrowed. Style capillary, the length of the tube; Stigma headed, emarginate, embraced by the anthers. Drupe large (size of a goose egg) oval, slightly furrowed on one side; covered with a smooth, red pellicle; pulp hardly perceptible. Nut fibrous, woody, very porous, one celled; kernel single.

I have only seen it in gardens, or about houses. In flower all the year.

WEBERA.

Webera adunca, H. (*Canthium parvifolium* Roxb.).

Spines axillary recurved; leaves ovate; peduncles axillary, one to four, one flowered.

Shrub: middle sized, branchy. Branches four cornered, furrowed, opposite, brachiate. Leaves opposite ovate, most entire, smooth, small, petioles short, below convex, above furrowed. Stipules two lateral, triangular, very small, withering. Spines axillary, solitary; short, recurved. Peduncles axillary, one to four, thread form, very short, one flowered. Bract oval, concave, two lipped, at the apex of the peduncle, embracing the base of the calyx. Flowers small, greenish yellow, nodding. Calyx perianth one leafed, bell shaped, obscurely five toothed, persistent. Corolla one petaled, funnel shape tube bellied; limb five cleft, segments lanceolate, spreading. Nect. Laciniæ numerous, linear, inserted into the throat of the corolla, hanging down within the tube. Stam: filaments five, thread form, very short, erect, arising from the throat of the corolla; anthers ovate, incumbent. Pist: Germ ovate, below; above truncate; Style awl form, villous round the base: Stigma cylindrical, five furrowed, emarginate. Berry roundish, depressed, two celled; crowned with the Calyx. Seeds: solitary, oblong. Grows in hedges, flowers in April.

HUNTERIA, Roxb.

"Gen: Char. Contorted; Calyx five parted; Corol one petaled, infundibuliform; Berries two."

Hunteria corymbosa, Roxb. "Leaves opposite, elliptic, polished; Corymbs terminal Berries short, pedicel'd, two-seeded."

Stem sub-arboreous. Leaves oblong, opposite, pointed, most entire, smooth, petioles short, slender, round, smooth, spreading. Stipules none. Corymbs terminal, trichotomous, compact, pedicels proper, very short, erect. Flowers small of a greenish white. Calyx Perianth very small, pitcher form, five parted, the segments lanceolate, erect, deciduous. Corolla, one petaled, contorted, infundibuliform; tube cylindrical, erect, bellied at the base and throat, limb five cleft, segments lanceolate, erect. Nectary a glandular circle, surrounding the base of the germ. Stam: Filaments five, very short, erect, in the throat of the tube, anthers oblong, erect, within the throat. Pist: Germ ovate, compressed, furrowed, easily parted into two, style thread form, the length of the tube; stigma headed, embraced by the anthers. Berries two, obovate, smooth, sub-bilocular; on pedicels very short, opposite, horizontal. Seeds two, ovate, within flat, without convex.

Found near the Honble. Company's spice plantation. Flowers in June.

GARDENIA.

Gardenia florida. Cultivated in gardens.

NERIUM.

Nerium sinense, H. (*Strophanthus* sp.).

Dichotomous; leaves lance-ovate; peduncles from the splitting of the branches, bifid; two or three flowered; segments of the corolla lanceolate. Stem shrubby. Branches dichotomous, spreading. Leaves opposite, short petioled, lance-ovate, pointed, smooth. Peduncles from the splitting of the branches, bifid, two or three flowered. Flowers large, of a deep orange colour. Calyx perianth one leafed, five parted; segments lanceolate, acute, erect. Corolla one petaled, contorted, salver shape; tube bellied, five furrowed; limb five cleft; segments lanceolate, very long, spreading. Nectary a glandular circle, starred, crowning the tube; ten toothed, the alternate teeth longer and growing to the segments of the corolla. Stam: filaments five, awl-shape, very short, in the base of the tube; anthers awl-shape, without convex horny; within angular; converging; shedding the pollen from a furrow of the internal angle near the tip. Pist: Germ above, conical, two furrowed. Style clubbed, erect: stigma blunt, closely embraced by the anthers. Follicles two, cylindrical, long, nearly joining at the tip, hanging. Seeds many, oblong, pappous, imbricated.

This elegant shrub was introduced from China, and is cultivated in the Honourable Company's spice plantation. (It is apparently lost out of cultivation now here).

Loureiro's description of his Nerium divaricatum agrees well with this species; except that the branches can hardly be called divaricate. But his plant is evidently different from the *Nerium divaricatum* of Linneus; and the figure to which he refers (Burman. Zeylan. p. 163, t. 78, fig. 1.) does not at all correspond with this plant. This shrub has a great affinity to the *Nerium caudatum* of Dr. Roxburgh.

ECHITES.

Echites? paniculata, H.

Shrubby; Leaves oblong, pointed; panicles axillary, decompound nectary of five glands, round the germ. It much resembles the *Echites parviflora* of Dr. Roxburgh.

Shrub middle sized. Branches round, smooth, knotted. Leaves opposite, decussated, petioled, widely spreading, oblong, pointed, most entire, above glossy, beneath smooth. Petioles short, roundish, smooth, spreading. Panicles axillary decompound, diffuse; the partial ones opposite, of four pairs with an odd one, widely spreading, composed of three or five umbels. Flowers very small, yellow. Calyx, perianthium one leafed, pitcher form, very small, five parted, segments ovate, acute, erect. Corolla one petaled, funnel shape, contorted, limb five cleft, widely spreading; segments oblong, obtuse, bent to the left, shaggy above. Nectary glands five, ovate, surrounding the germ. Stam: filaments five, thread form, very short, erect; anthers arrow-shape, ciliate, converging. Pist: Germs two, ovate, compressed internally; Style thread form; very short: Stigma headed, pointed, glutinous; embraced by the anthers.

Not having seen the fruit, the genus is still somewhat uncertain.

PLUMERIA.

Plumeria obtusa, Roxb. Cultivated in gardens.

FLEMINGIA, H.

Gen. Char. Flower one petaled, below; berry two or four celled, many seeded; Stamina erect. *Flemingia fragrans.* Yaroon Pitree. Malay.

Stem, a tree, erect, very branchy. Leaves crowded towards the ends of the branches, spreading, petioled, oblong ovate, pointed at both ends, most entire, smooth, without nerves. Petioles short, round, smooth. Stipule axillary, withering. Peduncles axillary, round, smooth, spreading, shorter than the leaves; trifid; the partial ones again twice trifid making 27 flowers in the entire corymb fastigiate. Flowers middle sized, of a whitish yellow or cream colour fragrant. Calyx, perianth one leafed, pitcher form, very small, five cleft, persistent; segments ovate, converging. Corolla one petaled, funnel form, tube short, dilated at the throat, limb five cleft, segments ovate, obtuse. Stam: filaments five, thread form, erect, longer than the corol, arising from the throat of the tube; anthers oblong small, incumbent. Pist: Germ above, ovate, very small: Style thread form, erect, the length of the Stamina; Stigma blunt. Berry small, globular, smooth; two (or four) celled. Seeds: many, shape-lees, rough.

The Berry being of a delicate texture, it is difficult to ascertain whether it has two or four cells. In the first case, it will come near Fagroea, and ought to come before Plumbago, in this Catalogue. This tree is found in a garden in the Prince of Wales's Island, but is not indigenous. Whence it came is unknown.

The flowers are very sweet scented. The fruit is bitter, and said to be poisonous. (Apparently some species of *Webera* the Jarum Jarum of the Malays).

HEXANDRIA—MONOGYNIA.

BROMELIA.

Bromelia ananas. The Pine Apple.

Cultivated, but require and receive very little attention, so that in many parts they appear to be growing wild. Ten thousand plants are reckoned to fill an Oorlong of ground, producing, in the second year one pine apple each. A variety, with the leaves variegated has been introduced from the Moluccas.

CRINUM.

Crinum zeylanicum. In gardens.

GETHYLLIS.

Gethyllis lanceolata ? (*Curculigo* sp.).

Leaves lanceolate, ovate, plaited. Spikes radical, ovate. vaginae or scales, lanceolate, concave, sessile. Flowers small, yellow; segments lanceolate. Cultivated in gardens. Came from China.

DRACOENA.

Dracoena ferrea. (*Cordyline terminalis* var. *ferrea*).

The germen when the plant is in flower, being dissected, contains in each cell (three in number) the rudiments of several seeds. Probably only one comes to perfection. At the root of the pedicel of each flower are three small lanceolate scales, which Loureiro calls a three cleft proper Perianthium. The stem is correctly described by Loureiro, and certainly does not at all correspond with the specific character of Linneus, "*arborea.*"

LICUALA.

Licuala spinosa, Willd. 2, p. 201. Thumb. nov. gen. 70. Gaeertner. fruit. 2.268. *Corypha pilearia.* Loureiro. ed. Willd. p. 265. *Corypha licuala* Lamarck. Encyclop 2, p. 231.

Calyx, perianth one leafed, cup-shape, without villous, leathery ; three cleft ; segments erect, obtuse. Corolla one petaled, three cornered, three cleft ; segments lanceolate, erect. Nect. a ballous circle, stamen bearing, adnate to the tube of the Corolla. Stam : Filaments six, very short, erect, arising from the margin of the nectary, anthers twin. Pist : Germ above, turbinate, three lobed, style thread form erect, the length of the stamina, stigma sharp, two cleft. *Licuala arbor.* Rumph. 1. p. 44. t. 9. is said to represent it. But, in all the specimens I have seen the spadices of the fructification rise much higher than the leaves, whereas the contrary appears in the figure of Rumphius. The tree is very common on the Island.

DIGYNIA.

ORYZA.

Oryza sativa, Rice. Bras. Mal.

Of this there are, as in Cochinchina and other eastern countries, two principle varieties, one growing in low watery ground, (Gaga) and the other on the sides of the hills (Sawa). As the seeds of the one cannot be successfully cultivated in situations adapted to the other, they are probably distinct species, though their distinguishing marks have not been hitherto discovered.

TRIGYNIA.

FLAGELLARIA.

Flagellaria indica, Willd. 2, p. 263. In hedges by the road side : Flowers in July.

OCTANDRIA—MONOGYNIA.

OSBECKIA.

Osbeckia tetrandra, Roxb. (*Anplectrum glaucum* Triana).

" Shrubby, scandent; Leaves opposite, 3 nerved; panicle terminal, Flowers tetrandrous." Found near the waterfall.

ALLOPHYLUS.

Allophylus racemosus ? Leaves ternate, flowers racemous. Swartz. Prod. p. 62. *Ornitrophe occidentalis ?* Willd. 2, p. 323. " Leaves ternate; leaflets subsessile, racemes simple." W. *Allophylus ornitrophioides ?* Roxb. " Leaves ternate; leaflets lanceolate, serrate, Racemes axillary, simple. Petals woolly on the whole of the inside R." Cheen chang. Malay.

Stem twining, round, shrubby; covered with a rough brown bark. Branches scattered, spreading. Leaves scattered, ternate; leaflets oblong-ovate, acute sub serrate, smooth, petioles common, long, straight, spreading, furrowed above, proper, very short, stipules none; bracts none: flowers very small, in racemes axillary simple, erect; when the fruit is ripe drooping. Peduncle, common, the length of the leaves; proper, very short, scattered. Calyx Perianth four leaved; leaflets ovate, obtuse, concave, persistent; the two outer smaller. Corolla petals four, obovate, retuse, ciliate, concave, a little smaller than the leaflets of the calyx; with wedge form claws. Nectary, glands four, reniform at the bases of the claws of the petals. Stam: filaments eight, subulate, erect, villous, at the base, the length of the calyx; anthers twin. Pist: Germ above, roundish, villous, twin; style columnar, from the fissure of the germ, erect, stigmas two, acute, reflex. Drupe small, roundish, smooth. Nut, globular, with a thin shell; kernel roundish, irregularly furrowed. Obs: One lobe of the germ is always abortive.

Found in thickets, climbing on other shrubs. (A variety of *Allophyllus cobbe* Bl. apparently, but I never saw it climbing).

MIMUSOPS.

Mimusops elengi. In gardens.

XYLOCARPUS.

Xylocarpus granatum, Willd. 2, p. 328. *Granatum littoreum.* Rumph. 3, p. 92, t. 61. Kayo Neeree. Mal. Found near Soongey Clooan, in thickets within reach of the tide.

LAWSONIA.

Lawsonia inermis. Cultivated in gardens.

MELICOPE.

Melicope tetrandra, Roxb. (*Tetractonia Roxburghii* Hook. fil.).

Stem: arboreous, straight, tall. Branches only near the top, crowded, dichotomous, covered with a rough bark. Leaves towards the extremities of the branches, crowded, opposite, decussated, petioled, obovate, most entire, smooth, below sprinkled with glandular points, petioles short, round, smooth, thick at both ends. Panicles axillary, and terminal, diffuse. Peduncles partial, nearly opposite, cross armed. Flowers minute, whitish, sweet scented. Calyx Perianth one leafed four cleft; segments triangular. Corolla petals four, ovate, acute, spreading. Nectary, a glandular circle, surrounding the germ. Stam: Filaments four, thread form, spreading, the length of the corolla, inserted between the nectary and the calyx, anthers reniform. Pist: Germ four, cleft; style thread form, erect, stigma obtuse.

I did not see the ripe fruit. Found on the hill. Flowers in May.

ENNEANDRIA—MONOGYNIA.

LAURUS.

1. *Laurus cinnamomum*, Willd. 2, 477.

" Folis trinervis ovato-oblongis, nervis versus apium evanescentibus." " Leaves opposite, three nerved, ovate, oblong; Panicles terminal. Nectarial glands clavate." Roxb.

Kayo-manis. Mal. The Cinnamon Tree. A few cultivated in gardens, as a curiosity or for ornament.

2. *Laurus culilaban,* Willd. 2, 478.

"Folis trinervis oppositis." *Cortex caryophylloides.* Rumph. 2, p. 65, t. 14. Coelit Lawan. E. N. C. dec. 2, ann. 3, p. 53.

The leaves of this tree greatly resemble those of the former, and the distinction above quoted from Linneus is insufficient and inaccurate. The following are the chief particulars in which they differ.

1. The trunk of the Culilaban is erect and straight, and the foliage rises in a conical form, terminating in a point. The trunk of the Cinnamon is crooked and its foliage spreads irregularly.

2. The leaf of the Culilaban is three nerved, exactly like that of the Cinnamon; that is the nerves meet in the base, or as near it as those of the Cinnamon, and like it they vanish towards the point. But this leaf is more oblong and pointed that of the Cinnamon, so as to become lanceolate.

3. Not having seen the tree in flower, I cannot say whether a mark of distinction can be taken from the situation and structure of the panicle; or from the parts of the flower. But if the fruit is truly represented by Rumphius it is very remarkable.

4. The young leaves of the Cinnamon have a yellow colour richly streaked with red. Those of the Culilaban are much paler, and of an uniform colour, without any mixture of red.

There are many young trees in the Honourable Company's spice plantation; and several in private gardens. From the bark and roots an oil is obtained by distillation in the Moluccas, which is highly esteemed as a powerful and agreeable aromatic.

ANACARDIUM.

Anacardium occidentale. The Cashew nut.

Now very common, but I have not observed it in the Forests.

CASSIA.

Cassia alata, Willd. 2, 523.

"Folis octo-jugis ovali oblongis exterioribus minoribus, petioles glandulatis, stipulis pătulis."

The above character being quite insufficient the following is given by Dr. Roxburgh.

"Shrubby, Leaflets 10-12 pairs, linear oblong; no glands. Stipules rigid. Racemes terminal. Bracts coloured, caducous. Legumes enlarged on each side, with a broad, crenulated, membranous wing; Seeds numerous."

Glengang-gaja. Malay. Dawun Coopong, Amboin.

The leaves bruised and applied in form of epithem, are said to cure herpetic eruptions. It is used for the same purpose in the West Indies, where it has obtained among the French the name of Herbe aux Dartres. Herpetica. Rumph. 7, p. 35, t. 18.

COESALPINIA.

1. *Coesalpinia sappan*, Willd. 2, 533.

Roxb. Corom. Pl. 1, p. 17, t. 16. *Lignum sappan* Rumph. 4, t. 21. *Tsiam pangam.* Hort. Mal. 6, p. 3, t. 2. A few plants in the Honourable Company's spice plantation.

2. *Coesalpina bonduccella*, Roxb.

Guilandina bonduccella, Willd. 2, 534. Globule majores Rumph. 5, p. 92, t. 49, f. 1. Found near Soongey Clooan.

3. *Coesalpinia resupinata*, Roxb.

"Arboreous, sub-scandent, armed: Leaves bipinate: pinnae 10-12 pair; Leaflets minute, 10 paired. Common petiole armed on the under side. Stipules most minute, caducous. Racemes axillary, Flowers resupine. Legume two seeded, contracted between them.

Very common everywhere by the road side. Being a strong prickly shrub, and very branchy, would make a good hedge.

POINCIANA.

Poinciana pulcherrima. *Coesalpinia pulcherrima,* Willd. 2, p. 531. Cultivated in gardens.

HYPERANTHERA.

Hyperanthera moringa, Willd. 2, p. 536. (*Moringa pterygosperma Roem*). Pretty common, planted, but I have not seen it wild.

MURRAYA.

Murraya exotica, Willd. 2, p. 548. *Chalcas paniculata.* Mant. 68. *Chalcas cammuneng.* Burm. ind. 104. *Camunium.* *Rumph.* 5, t. 18, f. 2. *Marsana buxifolia.* Sonnerat. 2, p. 245, t. 139.

Of this there is at present on the Island, only one young tree, in the garden of Lieut. Col. Polhill. It has not yet ripened seeds. But the tree is pretty common in the neighbourhood of Queda, and the wood from the upper part of the root, which is yellow with veins of a darker colour, takes a beautiful polish. Of this the Malays make the sheaths and handles of their creeses. The flowers are very fragrant. Kayo-Kamoonin. Mal.

New Genus? To stand between *Boswellia* of Dr. Roxburgh and *Gilbertia* (Gmel. syst. nat. p. 682), or Quivisia (Jussieu p. 293). Gen. Char. Cal. 5-leafed (or 5 parted) Cor. 5-petaled. Nectary a glandular circle surrounding the germ. Filaments long. Capsule 5-celled, with half partitions down the middle of the valves, nearly subdividing the cells. Seeds two in each cell.

Stem: a tree, erect, with branches crowded. Leaves sparse, about the extremities of the branches, petioled, obovate, most entire, smooth. Petioles short, spreading, smooth; below convex, above flat. Stipules none. Peduncles axillary and terminal; dichotomous. Flowers small, a whitish yellow. Calyx perianthium five leaved; leaflets ovate, erect. Corolla petals five, roundish, erect, a little larger than the calyx. Nectary, a glandular circle, surrounding the germen. Stam:

Filaments ten, inserted on the outside of the nectary, thread form, erect, many times longer than the corolla, anthers oblong, erect. Pist: Germen roundish, smooth, style thread form erect, the length of the stamina, stigma headed. Capsule oblong, five celled, five valved, valves lanceolate, opening at the apex; partitions double, formed by a stiff membrane turned inwards from the edge of each valve; a half partition runs longitudinally down the middle of the inside of each valve. Seeds, two in each cell. Found on the top of the hill. Flowers in May.

MELASTOMA.

1. *Melastoma muricata*, H. *M. decemfidum* Roxb.

Shrubby, erect; Leaves five nerved, lance-ovate, acute, most entire, rough; Calyx muricated, slightly ten cleft, the alternate divisions deep. Stem, shrubby, erect, round; about seven or eight feet high. Leaves opposite, decussated, lance-ovate acute, most entire, above scabrous, below bristly, petioles short depressed, above furrowed, bristly, widely spreading. Peduncles terminal, three or four, very short, hispid, one flowered. Flowers large, purple. Calyx, bell shape, muricated, with long soft spines, the mouth ten cleft; segments lanceolate, acute, hispid; the alternate ones larger and firmer. Corolla petals five, wedge shape, retuse. Stam: filaments ten, thread form, erect, half the length of the corolla, inserted into the calyx, anthers long, awl-shape opening at the apex with an oblique hole; the six alternate ones tailed, refracted, the tail long, declining, bent, bifid at the base, without scales. Pistil as in the generic characters. I did not see that fruit. Found on the hill. Flowers in May. It varies with calyx 12 cleft, six petals and twelve stamina.

2. *Melastoma malabathrica*, Willd. 2, p. 592.

Shrubby, erect; Leaves five nerved, broad lanceolate, acute, most entire, rough; Calyx imbricated five cleft. M. quinquenervia hirta, major, capitulis, sericeis, villosis, Burn. Zeyl. 155 t. 73. Kedali. Hort. Mal. 4, p. 87, t. 42. Fragarius niger Rumph. 4, p. 137, t. 72. Kedoodoo. Mal.

Stam: shrubby, branchy, about six feet high. Branches scattered, round, pubescent. Leaves opposite, decussated, lanceolate, most entire, scabrous, villous, five nerved; the outer nerves more slender near the margin of the leaf, petioles short, round, spreading, villous. Flowers terminal, peduncled, about four, large, purple. Peduncles very short round, erect, villous. Bracts two, at the root of each peduncle, ovate, concave, concave, covering the calyx, deciduous. Calyx perianth one leafed, bell-shaped, five cleft, imbricated with lanceolate, silky scales, of a greenish purple colour. Corolla, petals five, wedge-shape, obtuse, sessile, erect, inserted into the throat of the calyx, between its segments. Stam: as in the last species. Pist: Germ ovate, villous, in the belly of the calyx, style thread form, erect, longer than the corolla, stigma obtuse. Berry globular, five celled, wrapped up in the calyx, which converges with a five angled mouth. Seeds very numerous minute, nestling on the exterior convex surface of the pulp in each cell. Obs: when the fruit is ripe the calyx opens in a circular form round the base, and leaves the pulp uncovered.

It is a very common shrub abounding everywhere on the road side; and is one of the first that springs up on ground which has been cleared of the large timber.

3. *Melastoma osbeckioides*, H. (*Dissochaeta punctulata* Hook.).

Shrubby, scandent; Leaves five nerved, with transverse parallel streaks, cordate, ovate, acuminate, most entire, smooth; calyx smooth, obscurely four toothed, flowers octandrous; Panicles axillary and terminal.

Stam: twining, knotted, round, smooth. Leaves opposite, petioled, reclining; cordate, ovate, acuminate, most entire, smooth, five nerved, with transverse parallel streaks, petioles: short, channelled above, smooth, widely spreading. Peduncles axillary and terminal, round, smooth, forming a lax panicle: partial peduncles opposite, brachiate, spreading, generally three flowered. Flowers middle sized, whitish. Calyx pitcher-shape, obscurely four cleft, smooth. Corolla, petals four, ovate, obtuse, white with the margin reddish. Stam: Filaments eight; anthers long, subulate, refracted, incurved, with two subulate, parallel, cells, the apex opening with an oblique hole. Scales two, long, very slender, a third very short and lanceolate. Pist: Germ as in the generic character; style thread form, ascending; stigma simple.

I did not see the fruit. Found on the top of the hill. Flowers in May.

4. *Melastoma tomentosa*, H. (*Dissochaeta annulata* Hook. fil.).

Shrubby, scandent, Leaves five nerved, reticulated, cordate ovate, acuminate, most entire, tomentose below. Calyx tomentose, four cleft; flowers octandrous, panicles terminal. Stam: twining, knotted, round, tomentose. Leaves opposite, petioled, widely spreading, cordate, ovate, acuminate, most entire, tomentose below, five nerved, reticulated, petioles, short, round, tomentose, widely spreading. Peduncles for the most part terminal (a few axillary) round, tomentose; forming a diffuse panicles partial peduncles opposite, brachiate, widely spreading, generally three-flowered. Flowers, large rose colour. Calyx pitcher-shape, four cleft, tomentose. Corolla, petals four, ovate, obtuse. Stam: filaments eight. anthers as in the last species. Scales two, long, very slender; a third very short, bifid. Pist: Germ and style as in the preceding. Stigma rather sharp, gaping with a papillous mouth. Place and time of flowering the same as the last.

AVERRHOA.

1. *Averrhoa bilimbi*, Willd. 2, p. 749.
2. *Averrhoa carambola*, Id. 2, p. 750.

Both cultivated; and the fruit used for tarts.

RHIZOPHORA.

The essential character of this genus consists in the seed which is solitary, sub-cylindric, with only its base contained in the pericarpium. The parts of the flower admit of such diversity, both in number and form, that this genus might be divided into several, which would stand under different classes in the Linnaean system, though constituting one natural order. This subdivision may become necessary, should many new species be discovered.

Rhizophara mangle, Willd. 2, p. 843. *(R. conjugata* L.*)*.

"Leaves opposite, elliptic; acute, Peduncles three flowered. Flowers octandrous; Petals four, woolly on the inside." Roxb. Jacquin. Amer: 141, t. 89, gives a very full and accurate description. He says the peduncles are two, and three cleft. The former is what I observed. Pee Candel Hort Mal. 6, t. 34. *Mangium calendarium* Rumph. 3, t. 71. Bacow. Malay.

Found in grounds overflowed by the tide. Flowers in January.

GARCINIA.

Garcinia Mangostana, Willd. 2, p. 148.

There is hitherto only one tree on the Island old enough to bear fruit; but many have been planted of late. It flowers in April, and ripens its fruit in June; at which season plenty of the fruit is brought from the opposite continent, and it continues in season till August. At Malacca they have a second season in December.

STERCULIA.

1. *Sterculia balanghas*, Willd. 2, p. 872. Phun-pho of the Chinese, who eat the seeds when toasted.
2. *Sterculia foetida*, Willd. 2, 874.

ICOSANDRIA—MONOGYNIA.

PSIDIUM.

Psidium pyriferum, Willd. 2, 957. The guava. Cultivated.

EUGENIA.

There appear to be several species on the Island, but I have not sufficiently examined them.

MYRTUS.

Myrtus tomentosa, Willd. 2, 968. *M. canescens* Lour. (*Rhodomyrtus tomentosa*). Very common everywhere by the road side.

PUNICA.

Punica granatum. The Pomegranate. Booa Delema. Mal. Cultivated.

LAGERSTROEMIA.

Lagerstroemia reginae, Willd. 2, p. 1178.

Roxb. Corom. 1, p. 46, t. 65. Pretty common, and grows without cultivation; but having only seen it near to present or former European habitations I cannot say whether or not it is indigenous.

PENTAGYNIA.

MESPILUS.

Mespilus pomifera, Roxb. (*Eriobotrya japonica* Lindl.).

"Arboreous; Leaves lanceolate, very acute, serrate, downy underneath: Panicle terminal. Fruit obovate, villous." Loquat of the Chinese. There are many young trees, but none far enough advanced to bear fruit.

POLYGYNIA.

RUBUS.

Rubus moluccanus, Willd. 2, 1086.

"Folijs simplicibus cordatis, sub-lobatis, caule aculeato decumbente. Thunb jap." 219. *Rubus moluccanus latifolius.* Rumph. 5, t. 47, f. 2.

Found on the top and the sides of the hill. Fruit ripe in May. (No doubt *R. glomeratus* which is frequent there is very closely allied to *R. moluccanus* Roxb.

FRAGARIA.

A plant of this genus grows on the top of the hill, but I did not ascertain the species. The fruit is small and insipid. It is doubtless *F. malayana* of Dr. Roxburgh. (No species of strawberry is known to be indigenous to the peninsula).

POLYANDRIA—MONOGYNIA.

BIXA.

Bixa orellana, Willd. 2, p. 1154.

Several trees in the Honourable Company's spice plantation, and also in some private gardens; bearing fruit.

GREWIA.

Grewia paniculata, Roxb.

" Leaves short petioled, cuneate, oblong towards the apex, serrate, downy underneath, three nerved. Stipules two cleft; Panicles terminal mealy."

This is a tree, large and very branchy. Leaves alternate, cuneate, oblong, pointed, towards the apex serrate, scabrous above, downy underneath three nerved; widely spreading. Petioles short, round, villous, thicker at the apex. Stipules lateral, erect, very small, bifid; segments lanceolate. Panicles terminal, and axillary, diffuse, drooping partial peduncles alternate, spreading; proper very short, three flowered. Bracts lateral, like the stipules, at the bases of the peduncles. Calyx common, Involucrum, three flowered, three leafed; leaflets concave, three cleft, caducous. Proper, perianthium five leafed; leaflets obovate concave, villous. Corolla, petals five, trapezoid, emarginate, one half shorter than the calyx; the base concave within, nectariferous. Stam: filaments numerous (about 50) thread form, flexuous, the length of the calyx, rising from the pedicel of the germ; anthers roundish, two lobed. Pist: Germ ovate, villous, on short columnar pedicle, style awl-shape, erect, the length of the stamina, stigma simple. Drupe small, globular. Nut three celled, top-shape, hairy.

If with Schreber and Willdenow, we make a genus Micrococos distinct from Grewia, this tree will be included in the former. But the separation seems unnecessary. It is very distinct from *Grewia microcos* (Syst. Veg. 689) *Microcos paniculata* (Willd. 2, p. 1168, Burm. Zeyl. 74, H. M. 1, t. 56), which is a shrub, with lanceolate pointed leaves.

THEA.

Thea bogea, Willd. 2, p. 1180. *T. Floribus hexapetalis.*

Was imported from China, and thrives remarkably well, propagating itself without any trouble, by the seeds which drop spontaneously.

CORCHORUS.

Corchorus capsularis, Willd. 2, 1216.

Brought from China where it is used for hemp, as in Bengal. But the cultivation of it has not been extended.

TETRAGYNIA.

TETRACERA.

1. *Tetracera sarmentosa ?* Willd. 2, 1240. (*Delima Sarmentosa* L.).

"Shrubby, scandent, leaves ribbed, scabrous, serrate. Panicles terminal. Flowers monogynous. "Follicle one seeded" Roxb. Delima sarmentosa. Sp. p. 1, 736, Fl. Zeyl. 205. Amoen. Acad. 1, p. 403, Burm. ind. t. 37, f. 1. Frutex indicus sarmentosus, folis hispidis rigidis, adquamvis materiam livigandam commodissimus. Burm. Zeyl. 101. Mamplas Beteena, or Female Mamplas. Mal. It is probably the Palass of Marsden. Hist. Sumat. p. 76, who ascribes to its leaves the same use as memtioned by Burman, of polishing any substance; but Piripu. Hort. Mal. 7, p. 101, t. 54 referred to this by Willdenow, is a very different plant with leaves much longer, and soft, and with large stem clasping stipules.

Stem shrubby, scandent. Leaves scattered, oval, subserrate, rigid, scabrous: below with transverse nerves extending to the serratures; the upper surface deep green, the under paler, petioles: short, thicker at the base, furrowed above. Stipules none. Panicles terminal, diffuse. Bracts solitary, lanceolate, at the divisions of the peduncle. Flowers small, white, sweet scented. Calyx, perianthium four leafed; leaflets roundish, concave, wide spreading, the two inner ones larger, with the margin somewhat transparent. Corolla petals four, obovate, sessile, wide spreading, caducous. Stam: filaments numerous, capillary; the length of the corolla; dilated at the apex, anthers two lobed; lobes oval, distinct, laterally affixed to the apices of the filaments. Pist: Germen conical, hispid. Style subulate, incurved. Stigma obtuse. Follicle one, obliquely conical, opening at the superior suture. Seed one, its base covered with a laciniated membrane. Its roots are used by the Malay physicians as a restringent medicine in fluxes.

2. *Tetracera trigyna*, Roxb. (Doubtless *T. assa* Dec.) "Shrubby, scandent; Leaves serrulate, Panicles terminal. Flowers trigynous. Corol four-petaled. Follicles with several seeds in each." Is it *Tetracera euryandra* Willd. 2, p. 1242; Euryandra scandens. Forst. Prod. No. 228? Mamplas Jantan, or Male Mamplas. Mal.

Stem shrubby, scandent. Branches alternate, spreading. Leaves scattered, elliptic, acute, subserrate, the upper surface smooth, the under a little rough. Peduncles terminal, few flowered. Flowers middle sized, white, sweet scented. Calyx, perianth four leafed; leaflets ovate, concave, persistent; the twc outer ones thicker. Corolla petals four, cuneate, concave, spreading. Stam: As in the last species. Pist: Germs three, ovate; Styles three, awl-shape, divergent. Stigmas subulate. Capsules three, obliquely ovate, compressed, two valved, one celled, opening at the superior suture. Seeds four, ovate; the base surrounded with a long down.

This elegant climbing shrub is frequently found in hedges, by the road side. Its flowers have an agreeable perfume. It blossoms twice a year, (like most of the plants on the Island, where the sun is twice vertical) in April and October. When the fruit is ripe, the downy or silk substance, which surrounds the base of the seed, and serves as awning, is of a fine scarlet colour.

DILLENIA.

Dillenia secunda, H. (*Wormia* prob. *oblonga* Wall.).

Leaves oval, acuminate, sub-serrate; racemes one sided. Stam: arboreous, erect. Leaves scattered, petioled, large, oval, acuminate, obscurely serrate, smooth. Petioles short, villous, spreading, convex below, furrowed above. Racemes terminal, few flowered, one sided ; proper pedicels short, straight, a little villous. Flowers large, yellow. Calyx, perianth five leafed ; leaflets roundish, concave, coriaceous, villous, without, smooth within, large, widely spreading, persistent. Corolla, petals five, obovate, twice the length of the calyx, widely spreading. Stam : filaments very numerous, club-shaped, in a double series ; the outer, many, spreading, slender, shorter than the calyx ; the inner fewer, erect, thicker, shorter than the former, closely surrounding the germ, anthers linear, erect, the inner twice as long as the outer. Pistil, germs eight or nine, subulate, acuminate internally connected; Styles none; Stigmas one to each germ, lanceolate, patent, forming a star. Follicles eight or nine, hatchet-shaped, straight within, convex without; at first erect; when ripe reflected, opening at the interior suture. Seeds : few, reniform, covered with a fleshy aril, connected to the interior suture of the capsule.

A native of the hills. Flowered in the Honourable Company's spice plantation.

NELUMBIUM, Willd.

Juss. Gen. Pl. ed. Uster p. 76. Gen. Char. "Calyx four or five leafed; Cor. many petaled. " Nuts one seeded; crowned with the persistent style, immersed in a truncated receptacle."

Nelumbium speciosum, Willd. 2, p. 1258.

"Root creeping, Leaves peltate orbicular, entire; Peduncles and petioles murexed, flowers double rose coloured or white. " Roxb. *Nymphoea nelumbo* Linn.

Growing in tanks ; the seeds esculent.

UVARIA.

Uvaria odoratissima, Roxb. (*Artabotrys odoratissima*).

In the Company's spice plantation. Came from China.

ANNONA.

Annona squamosa, Willd. 2, p. 1265, the custard apple.

Cultivated, the fruit plentiful and of a good quality.

DIDYNAMIA—GYMNOSPERMIA.

PLECTRANTHUS.

Calyx with the upper segment larger ; Corolla resupmate, ringent, the tube above gibbous or spurred.

Plectranthus scutellarioides. (*Coleus scutellarioides* Benth.).

Nectary gibbous, racemes terminal, three fold, verticelled. pedicles branched ; leaves ovate, serrate, downy above, veined below. *Ocimum scutellarioides* Willd. 3, p. 166. *Majorana rubra* Rumph. 5, p. 291, t. 101.

Stem : herbaceous, erect. Branches opposite, brachiate, four angled. Leaves opposite, decussated, petioled, ovate, pointed serrate ; above downy, below veined. Petioles short, declining. Stipules none. Racemes : terminal, three fold, verticelled : Peduncles opposite, two parted ; the partial ones four or five flowered. Bracts cordate, acuminate, at the bases of the peduncles. Flowers small, of a purplish blue. Calyx, perianthium bell-shape, four cleft : the upper segment larger, ovate, obtuse ; the lower two cleft, acute ; the two lateral very small obtuse. Corolla one petaled, ringent, resupinate, tube reflected gibbous above, throat drooping, limb, upper lip ascending, two cleft ; lower boat-shape declining. A gland ovate, erect, within the calyx, at the base of its lower segment. Stam : Filaments four, awl-shaped, declining, hid within the lower lip of the corolla, united at the base ; the two upper a little shorter. Pist : Germs four, ovate ; style thread form, a little longer than the stamina ; stigma slightly bifid, with segments acute. Per : none. Seeds : Four.

The branches, leaves, petioles, and peduncles are all of a brown or purple colour. Cultivated in Gardens. (The little cultivated coleus).

ANGIOSPERMIA.

BIGNONIA.

Bigonia? laciniata, H. (*Stereospermum fimbriatum* Dec.).

Leaves pinnate with an odd one, leaflets ovate, acuminate, most, entire villous; calyx one leafed five toothed; corolla funnel-shaped, five cleft, laciniated. *Lignum equinum* Rump. L. 4, c. 40, t. 46?

This is a tall tree, with a rough, ash-coloured bark. Branches towards the top of the trunk, numerous ascending. Leaves towards the extremities of the branches, crowded, opposite, decussated, pinnated, four pairs with an odd one; leaflets ovate, acuminate, obliquely sub-cordate, most entire, villous, petioles common, swelled at the base, half-round, furrowed above, villous, spreading; proper very slender, very short, spreading. Panicles terminal, divaricate; common peduncle columnar, knotted, villous; partial brachiate, horizontal, dichotomous. Flowers large, white, with purple streaks. Calyx one leafed, cylindrical, five toothed; toothlets lanceolate, erect. Corolla monopetalous, funnel-shape, tube cylindrical, a little longer than the calyx, throat large, dilated, below flat, a little bent; without villous; limb spreading, five cleft, nearly equal, segments obtuse, laciniated. Stam: filaments four, arising from the tube of the corol, approaching by their apices in pairs archwise, the two outer longer: in the middle a very short rudiment of a fifth stamen, anthers oblong, twin; lobes widely spreading, touching by their upper surface those of the opposite anthers. Pist: germ oblong, sitting on a glandular ring. Style thread form, the length of the larger stamina. Stigma spathulate.

Not having seen the fruit I cannot certainly ascertain the genus. It flowers in January, at which time the ground about the tree is richly strewed over with its beautiful flowers.

GMELINA.

Gmelina integrifolia, H. (*G. asiatica* L.).

Leaves most entire; Raceme simple terminal. Stam: a large shrub, very branchy, with spines awl-shape, acute, horizontal. Branches spreading, flexile, with spines, opposite decussated. Leaves opposite, decussated, petioled, ovate, obtuse, most entire ; above roughish, deep green, below downy. Petioles half the length of the leaves, slender, downy. Racemes simple, terminal, few flowered. Flowers large, yellow ; structure as in the generic character. Drupe roundish, smooth, of a greenish yellow. Nut obovate, smooth three celled : one cell barren. Kernels in the fertile cells solitary, obovate, without convex, within flat.

This shrub, which approaches in size to a small tree, is very common in hedges, by the road side.

The fruit contains a juice of a disagreeable smell, and gives a very permanent stain, of a yellowish brown colour.

PREMNA.

Premna cordifolia, Roxb.

"Shrubby ; Leaves cordate and cordate ovate, entire, smooth, upper surface bullate and shining. Corymbs terminal, decussated with ramifications dichotomous."

The leaves have a very acrid taste. Pretty common among the underwood, in places which have been cleared of the great timber.

VOLKAMERIA. (*Clerodendron*).

1. *Volkameria inermis*, Willd. 3, 383. (*Cl. inerme*).

In gardens. I do not know whether or not it is indigenous.

2. *Volkameria fastigiata*, H.

Unarmed ; Leaves ovate, unequally serrate. Corymbs terminal, trichotomous, suffastigiate. Stem herbaceous ; or perhaps somewhat shrubby. Leaves opposite, decussated, petioled, ovate, unequally serrate, wrinkled ; above smooth, below slightly downy. Petioles short, slender, furrowed above, widely spreading. Corymbs terminal, trichotomous ; peduncles brachiate, three cleft pedicels short, slender. Flowers large, white, sweet scented. Calyx five cleft, segments lanceolate, erect; when the fruit ripens reflected. Corolla tube long, straight; limb five cleft segments obtuse, inclining to one side. Stamens. Filaments thread form, the length of the corol, white; anthers small, deep yellow. Berry roundish, smooth.

The plant was brought from Amboyna, and flowered before it was removed from the box in which it came.

ACANTHUS.

Acanthus ilicifolius, Willd. 3, p. 398.

Growing by the sides of water-courses, and in low lands near the sea from which the mangroves (Rhizophora) have been cleared away.

THUNBERGIA.

Thunbergia fragrans, Willd. 3, p. 388. Roxb. Cor. 1, p. 47, t. 67. Pretty common by the road side.

MONADELPHIA—DODECANDRIA.

PTEROSPERMUM.

Gen. Pl. ed. Schreb. n. 1124. Willd. 3, p. 728, *Pterospermum ? parvifolium* H. (Probably *Pt. jackianum Rumph*).

Leaves alternate, lance-ovate, pointed, repand, smooth above, hoary beneath. Flowers axillary, solitary, subsessile.

Grows among the underwood, near the Honourable Company's spice plantation. Not having seen the fruit, the genus is still doubtful. Flowers in May.

POLYANDRIA.

BOMBAX.

Bombax pentandrum, Willd. 3, 731. (*Eriodendron anfractuosum*).

Pretty common, planted about houses in George Town.

URENA.

Urena lobata, Willd. 3, p. 800.

Pretty common among underwood, on the plain, and also on the top of the hill. Flowers in May.

GORDONIA.

Gordonia spectabilis, H. (No doubt *Schima noronhae* Burm.)

Arboreous; Leaves oblong ovate, pointed, subserrate, smooth; Flowers short, peduncled, Style one. Stem: arboreous, straight; branches ascending. Leaves, scattered, oblong-ovate, pointed, subserrate, above glossy, beneath smooth. Petioles short, slender, half round, reclining. Peduncles axillary, short, clubbed, solitary, one flowered, spreading. Bracts two, scale form, small, opposite, caducous, a little below the middle of the peduncle. Calyx perianth five leafed, leaflets roundish, concave, smooth. Cor: Monopetalous, wheeled, tube very short, limb five parted; segments ovate, concave, widely spreading. Stamens filaments numerous (about 75) awl-shape erect, arising from the tube; shorter than the corol, anthers roundish, twin. Pistil germ roundish, depressed, villous; Style columnar, four cornered, thicker above; Stigma flat, five angled. Capsule round, depressed, smooth, five celled, splitting at the top. Seeds two, in each cell, flat.

DIADELPHIA—DECANDRIA.

ABRUS.

Abrus precatorius. Growing among underwood on the plain.

PTEROCARPUS.

Pterocarpus draco. (*Pt. indicus*) Lingoum Rumph. 2, p. 205. t. 70. Suna. Mal.

Stem arboreous, columnar, very branchy. Branches round, drooping, with a scabrous bark. Leaves alternate, numerous, spreading, pinnated, four pairs with an odd one;

leaflets alternate, ovate, bluntly pointed, most entire, smooth. Petiole common, round, smooth, with a thick glandular base, proper, short, very slender. Racemes axillary, compound, Peduncles common, drooping, proper slender, the length of the flowers, spreading, scattered. Flowers small, yellow, sweet scented. Calyx perianth, one leafed,bell-shape; the mouth five toothed, the two upper toothlets larger, obtuse, the three lower sharp. Corolla papilionaceous, banner roundish, clawed, reflected; claw wedge form, extending to the centre of the banner. Wings hatchet form; arth claws thread form, the length of the banner, above with are versed tooth. Keel almost two petaled, a little shorter than the wings, with claws thread form, remote. Stam: filaments, at the base united into a cylinder, split on the upper side; a little higher, divided into two bodies, equal, lateral; which at half their length, are split, each into five awl-shape ascending, the length, of the keel. Anthers roundish. Pistil germ-oblong, sharp at both ends, short pedicelled, villous. Style awl-shape, ascending, the length of the stamina, stigma simple. Legume roundish, compressed, leaf like, not opening: a lanceolate tooth on the upper margin. Seed: one, flat. Obs. The Germ dissected contains the rudiments of four seeds.

This tree, being very branchy, and thickly covered with foliage, is very much planted about houses, and used to form avenues. It flowers in April and May, and the flowers are used to give an agreeable scent to the cocoa-nut oil, which the natives apply to their hair. The tree is very vivacious; large branches lopped off any way and put into the ground, shoot out roots and branches, their growth being quick, and an avenue is thus speedily formed.

ERYTHRINA.

Erythrina corallodendrum.

Used, as before mentioned, to prop the pepper vines.

CROTALARIA.

Crotalaria laburnifolia, Burm. Zeyl. 82, t. 35. In gardens; came from China.

ARACHIS.

Arachis hypogoea. Cachang goring. Mal. Cultivated by the Malays and Chinese, principally in their plantations of Betel nut and Cocoa nut trees, while young.

DOLICHOS.

Dolichos sinensis. Cultivated for the table.

CLITORIA.

Clitoria ternatea.

In gardens pretty common; but I have not seen it wild.

CYSTISUS.

Cystisus cajan.

A few plants in the neighbourhood of houses; but no regular cultivation.

ROBINIA.

Robinia megasperma, H. (Probably *Millettia atropurpurea*).

Arboreous; leaves unequally pinnated; five pairs; racemes terminal, compound, pedicels one flowered, crowded; legume one seeded.

Stem arboreous, large, erect. Branches towards the top of the stem, crowded. Leaves scattered, crowded at the extremities of the branches, pinnated, five pairs with an odd one; leaflets lance-ovate, most entire, smooth. Petioles common, round, rigid, thicker at the base; proper, short, widely spreading. Racemes terminal, compound; partial scattered, widely spreading; proper peduncles very short, reflex, crowded, one flowered. Flowers middle sized, purple. Calyx perianth pitcher-shape; mouth oblique, the two lateral teeth obliterated, the lower longer and more pointed. Corolla papilionaceous. Banner cordate ovate, concave; when the flower is fully spread, emarginate, reflected; claw flat, incurved, the length of the calyx. Wings oblong, converging, declining, a little shorter than the banner, with a very small obtuse appendix. Keel, boat-shape, the length of the wings, with two distinct claws. Nectary a glandular, cylindrical socket, within the sheath of the stamina, surrounding the pedicel of the germ, with mouth oblique, obscurely five-toothed, the upper toothlets longer. Stamens filaments diadelphous (simple and nine cleft) with apices ascending, the length of the keel. Anthers oblong erect. Pistil germ pedicelled, acinaciform, villous; Style subulate, ascending, a little longer than the Stamina; Stigma acute. Legume large, subovate, sharp at both ends; the upper suture gibbous; compressed smooth. Seed, one, ovate, very large.

HEDYSARUM.

Hedysarum purpureum, Roxb. (*Desmodium polycarpum*).

"Shrubby, lower branches diffuse, and longer than the upright stem. Leaves threed; leaflets oval, entire; Stipules daggered. Racemes terminal, before expansion strobiliform. Legumes six-seeded, notched on the under side."

INDIGOFERA.

Indigofera tinctoria.

Experiments have been made on the cultivation and manufacture of this dye. It is said to have thriven remarkably and yielded abundance of faecula, of a good quality. But the attempt was laid aside on account of the high price of labour.

POLYADELPHIA—DECANDRIA.

THEOBROMA.

1. *Theobroma cacao.*

A few plants in the Honourable Company's spice plantation.

2. *T. guazuma.* Several, in the same place.

ICOSANDRIA.

CITRUS.

1. *Citrus aurantium.*

Several orchards, particularly at Soongey Clooan, where they seem to answer better than in other parts. A small one, containing about two Oorlongs of ground, was let last year, for eight hundred dollars. Fruit in October.

2. *Citrus decumana.*

Is also in considerable quantity, but not equal to the fruit in Bengal.

3. *Citrus medica*, va. 8. Mill. Dict.

The Lime. In tolerable plenty.

POLYANDRIA.

MELALEUCA.

1. *Melaleuca leucadendron.* Kayo-pottee, Mal.

Several trees in the Honourable Company's spice plantation, and in private gardens. Imported from the Moluccas. Has borne flowers and seed.

2. *Melaleuca, an viridiflora ?* Linn. Trans. 3, p. 275, Gaertn. Sem. v. 1, 173, t. 35. *M. Leucadendron* B. Linn. Suppl. 342.

" M. folijs alternis elliptico lanceolatis, coriaceis, quinquenervijs, ramulis petiolisque pubescentibus." Smith. In my plant the branchlets and petioles are smooth ; it may be thus distinguished.

Leaves sparse, elliptic, lanceolate, rigid, five nerved ; spike terminal, elongate ; flowers sessile. Stem a tree, of middle size with a scabrous bark. Branches erect, round, flexible. Leaves towards the extremities of the branches, scattered, widely spreading, elliptic, lanceolate, sharp at both ends, thickish, rigid, five nerved, smooth, on both sides. Petioles very short, round, smooth. Spikes terminal, subcylindric, interrupted. Flowers small, whitish, sessile, scattered, covering by threes. Calyx perianth pitcher form, villous, adnate to the germ, five toothed, with toothlets obtuse, erect. Corolla petals five, ovate, concave, sessile, inserted into the calyx, between the teeth. Stam filaments numerous (40) thread form, united into five bundles (each containing from seven to nine) much longer than the corol; erect. Anthers reniform, above furrowed, incumbent. Pistil germ turbinate, growing to the bottom of the calyx. Style thread form, erect, length of the stamina, stigma simple. Pericarp and seeds as in the generic character. Growing by the road side, near a ditch which is never quite dry. The leaves, when rubbed, have a strong aromatic or resinous smell, approaching pretty near to that of *M. leucadendron.* (No doubt *M. leucadendron* var. *minor*).

HYPERICON.

Hypericon ? excelsum, H. (Doubtless *Archytea vahlii*).

Arboreous; flowers axillary, solitary, monogynous; leaves lance-ovate, alternate. It approaches near to *H. alternifolium* (Vahl. Symb. 2, 85, t. 42). Only differing in the monogynous flowers.

Stem arboreous, tall, straight; covered with a rough, ash coloured bark. Branches near the top ascending; branchlets alternate, spreading. Leaves alternate, lance-ovate, pointed, rigid, most entire, smooth. Petioles short, furrowed, above, spreading. Peduncles axillary, solitary, one flowered, clubbed, short drooping. Bracts two, very small, caducous, at the apex of the peduncle. Flowers white, about an inch in diameter. Calyx perianth, one leafed, five parted; segments ovate, obtuse, concave, coriaceous; the two outer ones smaller. Corolla petals five, ovate, obtuse, concave, spreading; smooth, sessile. Stamens filaments numerous (45) thread form, erect, very short; united into five bundles, which join at the base into one circle; Anthers oblong, four angled, pointed, erect villous. Pistil germ above, ovate, villous; Style erect, subulate, longer than the Stamina; Stigma simple. Berry ? (or perhaps a capsule, as I did not see it ripe) ovate, two and three celled. Seeds;

about four, in each cell, ovate, compressed. Obs: The germ is three celled, with free receptacles and many seeds. The stigma when magnified appears triangular, with three very small pores. After the flower has fallen, the style remains, and grows to double its original length or more.

The stamina are nearly monadelphous, the Calyx might perhaps be considered as five leaved. These circumstances, together with the monogynous flowers, berry or capsule with few seeds and alternate leaves, make me doubtful whether it can properly be considered as a Hypericon.

Grows on the sides of a valley, near the top of the hill. Flowers in May and January.

DURIO.

Durio zibethinus. The Doorian.

Only a few trees on the Island, but plenty of the fruit, of which the Malays are very fond, comes from the opposite shore.

SYNGENESIA—POLYGAMIA AEQUALIS.

CACALIA.

Cacalia bicolor, Roxb.

"Shrubby, ramous; Inferior leaves petioled lanceolate, remotely serrate; superior subsagittate, stem clasping, sublanciniate. Flowers terminal, peduncles with sub-lanceolate scales; calyx calycled."

Cultivated in gardens for the beauty and singularity of its leaves, which, are deep green on the upper surface, and a fine purple on the under. It grows very well on the top of the hill.

POLYGAMIA—SUPERFLUA.

CONYZA.

1. *Conyza balsamifera,* (*Blumea balsamifera*), Linn. Syst. Nat. ed. Gmel. 2, p. 1220. Suppl. 1208. Rumph. 6, t. 24, f. 1.

Boonga Chappa, Malay. "Leaves lanceolate, tomentose below; petioles also toothed.

Stem shrubby, six or seven feet in height. Branches round, striated, pithy, downy. Leaves scattered, ovate lanced, unequally serrated; above rough, below tomentose, spreading. Petioles very short, tomentose, furnished with one or two teeth on each side. Stipules none. Panicles axillary and terminal, diffuse; peduncle common, rigid, erect, from two to four cleft; partial like the common. Bracts at the divisions of the peduncles, solitary, lanceolate. Flowers pedicelled, cylindric, yellow. Calyx perianth common, imbricated, cylindrical; with scales lanceolate, erect; proper none. Corolla compound, tubular. Corollets, hermaphrodite, numerous, tubular, in the disc; female numerous, similar, in the circumference. Proper, of the hermaphrodites funnel-shape, the limb five cleft, patulous, segments lanceolate: of the females tube thread form more slender, limb three cleft. Stamens of the hermaphrodites, filaments five, capillary, from the middle of the tube, anthers united into a cylinder, longer than the corol. In the female none. Pistil germ oblong. Style thread form; Stigmas two, simple; in the hermaphrodites hid within the cylinder of anthers; in the female projecting beyond the limb of the corol, spreading. Pericarp: none. Seeds: oblong, striated; pappus hairy. Recept: naked, flat.

The leaves possess the exact taste and smell of the common officinal sage, and are used in the same manner for culinary purposes. The Malay physicians give an infusion of them in boiling water as a stomachic and carminative. Loureiro and Rumphius speak highly of its virtues.

It was given in a dropsical affection which broke out among the Polygars confined in irons on the Island.* This disease resembled that which attacked His Majesty's 80th Regiment at Trincomalay, and the Lascars on board of several ships on their voyage from England. In the present instance it proceeded from despondency, want of exercise and a damp situation. The patients had the infusion to drink, and the leaves, in substance, were mixed with their food. They found it grateful to the stomach, and it seemed to contribute to their cure; although being necessarily combined with other medicines, its proportional share of merit could not be well ascertained. The progress of the disease was arrested by removing the people to a drier situation, where they could enjoy the benefit of exercise, within certain limits. This however affords a presumption that the *Conyza balsamifera* might be found an useful addition to the sea provisions of Lascars and as it grows abundantly all over the uncultivated tracts, it could be supplied in almost any quantity.

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*(Was this Beri-beri)?

2. *Conyza odorata*, Linn. S. N. ed. Gmel. 2, 1221.

Eupatoria conyzoides maderaspatana, folijs glabris, flore purpurascente. Pluk. alm. 141, t. 177, f. 2. Loureiro. Fl. Cochinch. ed. Willd. p. 605.

Grows plentifully in low ground near the sea; flowers in September. The whole plant has a strong aromatic smell, which is perceptible at some distance.

ERIGERON.

Erigeron conyzoide, H. (Prob. *Crepis japonica* Benth).

Leaves ovate: lanceolate, pointed, repand, smooth; panicles terminal, umbelled; rays of the corol capillary. Stem herbaceous (or suffruticose) pithy, round, streaked. Leaves alternate, ovate lanceolate, pointed, repand, smooth. Petioles short, slender. Panicles terminal, diffuse; composed of many umbels; proper pedicels very slender. Flowers small, whitish. Calyx imbricated, with scales lanceolate, very small. Corolla compound, cylindrical, hardly radiate, corollets hermaphrodite tubular in the disc; females semiligulate in the ray. Proper of the hermaphrodite funnel form, limb five cleft. Of the female, tubular for two thirds of its length, tube capillary, very slender, limb two lipped; upper lip most minute, lower linear, revolute. Stam: In the hermaphrodites, filaments five, capillary, very short, anthers united into a cylindrical tube. Pist: as in the generic character; but the pappus is longer than the corolla in all the florets, female as well as hermaphrodite.

The rest as in the generic character. Found on the hill. Flowers in January.

MONOECIA—MONANDRIA.

NIPA, Gen. Pl. Schr. N: 1698.

Nipa fruticans, Gmel. 2, p. 12. Rumph. 1, 72, t. 16.

Each spath of male flowers, which grows alternately on strong semi-cylindrical peduncles, contains from six to twelve partial ones. Every one of these contains a simple amentum, covered with sessile male florets, closely compacted together. The petals are as described by Schreber ; but filament hardly any. Anther columnar, twelve furrowed, the length of the petals. Female flowers, only one spath, terminating the branch. Florets as described by Thunberg and Schreber. Drupes aggregate, forming nearly a globular head. The horizontal section of each drupe is nearly oval, with two projecting angles at the two ends of the longer axis, twelve longitudinal furrows on the surface. The pulp, fibrous, woody, porous. Nut shell thin, moderately hard. Seed or kernel, resembles the cocoanut in substance, is nearly tasteless, and would probably furnish plenty of oil.

The leaves, called Atup, are used for thatching.

CASUARINA, Schreb. N. 1395.

Casuarina equisetifolia, Gmel. 2, p. 13. *Casuarina littorea*. Rumph. 3, t. 57.

A good many trees, close to the sea, near Poolo Ticoos. (No doubt indigenous, as early as this, but the wild plants seem to have quite disappeared now).

ARTOCARPUS.

1. *Artocarpus incisa*, Gmel. 2, p. 14. B. fructu seminifero. Sonner. New Guin. t. 57-60.

Some pretty large trees about houses in George Town. I do not know whence they came.

2. *A. integrifolia*, Gmel. 2, p. 14.

Of this there are two permanent varieties, which Loureiro considers as distinct species.

A. Leaves obovate, below simply veined, petioles and middle rib smooth.

Jaccus arboreus major: Nanka. Rump. 1, t. 30. *Polyphema jaca*, Lour. ed. Willd. p. 667. Nanka, Malay. Jack of the English.

B. Leaves oblong, below reticulated, petioles and middle rib hairy.

Jaccus arboreus minor: Tsjampadaha. Rumph. 1. t. 31. *Polyphema champeden.* Lour. p. 668. Chimpada, Malay.

3. *A. muricata*, H. *(A rigida* Bl.).

Leaves oblong-ovate; fruit terminal, globose, muricated with sharp prickles.

Stem: arboreous, middle sized, very branchy. Leaves: oblong ovate, somewhat acute, most entire, smooth, sparse. Peticles: short. Peduncles: short, subterminal, solitary. Peduncles: short, subterminal, solitary. Fruit: compound, globular, muricated with awl-shape, rigid, brittle spines; something larger than a man's fist. Seeds: oval, each surrounded with its pulp.

The tree grows in the woods without cultivation. The fruit is ripe in July, and is brought to market by the Malays. The pulp surrounding the seeds, which is the eatable part, is yellow, of a very pleasant subacid taste.

I have heard three names given to it, Doomur, Doorian Ootang, and Booa Cleydang, but am not sure that any of these is the genuine Malay term (Curtis quotes this as only cultivated now in Penang).

4. *A. reticulata*, H. (Prob. *A. lanceaefolia*).

Fruit globose, reticulated with very small hexagonal prisms. This fruit is I am informed also terminal; but I did not see it growing. In size, shape, and internal structure it resembles the former; but its surface is composed of small hexagonal prisms, instead of sharp spines. Its time of ripening and the qualities of its pulp are the same as in the former.

I did not see the flowers of either species, so that the genus is yet uncertain, being only determined by the structure of the fruit.

GNETUM.

Gnetum, Linn. gen. Schreb. 1473.

Gen. Char, Flowers amentaceous, males below in three rows, females above in a single row. Corols none. Males calyx bell-shape, woolly at the base; Stamen one, anthers two lobed. Females calyx shut, becoming a berry sitting on a lacerated scale; Stigmas four, drupe one seeded. Jussieu. ed. Ust. p. 445. Genera urticis affinia.

Gnetum gnemon, Fig. No. 17. Linn. S. ed. Gmel. p. 1003, Syst. Pl. Reich. IV. p. 197. Gnemon domestica. Rumph. 1 p. 181. t. 72.

Stem: arboreous, erect. Branches: opposite, brachiate, horizontal, towards the top of the stem shorter, forming a conical head. Branchlets kneed, broader below the knots. Leaves opposite, oblong oval, pointed, most entire, above glossy, below smooth. Petioles short, convex below, flat above smooth, spreading. Stipules none. Peduncles axillary, solitary three cleft. Bracts two, lanceolate, very short, stem clasping, below the division of the peduncle. Aments three, thread form, drooping; composed of verticels remote, callous, thickened. Calyx partial of each verticel peltate, orbicular, most entire; containing sesile flowers, very minute; the males below in a triple row; the females above, in one row. Of the males: Calyx proper perianth one leafed, bell-shape with mouth almost entire, surrounded with down at the base. Corolla none. Stam, filament one, clubbed, erect, twice as long as the calyx, emarginate; anthers twin, with cells disjoined; each cell two valved, splitting at the tip. Of the females: Calyx, Proper perianth one leafed, ventricose, converging closely at the point, clothing the germ, persistent; surrounded at the base with a lacerated downy scale. Corolla none. Pist: germ ovate, covered by the calyx;

Style conical, very short; Stigmas four, acute. Drupe oblong, smooth, formed of the shut calyx. Seed: nut ovate, one celled; with shell thin, brittle, ten streaked. Kernel oval, smooth.

This tree was brought from Amboyna and is cultivated in some gardens. From the luxuriancy of its foliage, and the regular disposition of its branches, it is very ornamental. The pulp of the fruit, which is the persistent calyx, is of an orange colour, and of a sweetish taste, with a mixture of astringency. Rumphius says they are unfit to be eaten raw, as they cause an itching in the mouth. The young leaves boiled are eaten as spinach. The bark of the larger branches, prepared by bruising, is spun into threads at Amboina for fishing nets and other purposes.

In some specimens, the lateral aments have only male flowers; and I have never seen fruit borne on more than one ament, which I conceive to have been in the middle.

TRIANDRIA.

ZEA.

Zea mays. Cultivated, but sparingly.

PHYLLANTHUS.

1. *Phyllanthus cheramela,* Roxb. Cicca disticha. Gmel. 2, 287. Reich. 4, 125. *Averrhoa acida.* Syst. Nat. XII 3, p. 315.

"P. arboreous, leaflets ovate; racemes nodding, calyxes four leaved. Drupe, with nut four celled" Roxb. Cultivated in gardens.

2. *Phyllanthus agynus,* H. (*Breynia coronata*).

Shrubby, Leaves simple, alternate, bifarious; Peduncles axillary, one flowered; lower one, two or three together, male; upper solitary female; Calyxes six toothed; nectaries wanting; no Style, Stigmas three converging; Berries six seeded.

Stem: shrubby, very branchy. Branchlets: alternate, straight, round, spreading. Leaves: alternate, horizontal, petioled, ovate, acute, most entire, smooth, hoary below. Petioles: very short, very slender. Flowers: monoicous, very small, the males yellow, the females green. Peduncles: axillary, very short, very slender, drooping the lower, one, two or three together, bearing male flowers; the upper, solitary bearing females. In the Male flowers, Calyx Perianth one leafed turbinate, fleshy, pubescent without; six toothed obtuse, converging. Corolla none. Nectary none. Stam: Filament one, columnar: Anthers four, oblong, adhering lengthways to the filament below its point. In the Females. Cal: as in male. Cor: none. Nectary none. Pist: Germ pear-shaped, the size of the calyx, perforated at the top. Style none, stigmas three, awl-shaped, minute, rising from the edges of the perforation, converging. Capsule very small, globular, smooth, scarlet with yellow streaks, six valved, one celled. Seeds six, without convex, within angled, smooth.

Grows everywhere among the underwood.

PENTANDRIA.

NEPHELIUM, Schreb. No. 1425.

Nephelium lappaceum, Gmel. 2, 464. Rambootan. Mal. i. e. hairy.

This is a pleasantly subacid fruit, the pulp which covers the seed resembles that in the Leechee, and is the edible part. The fruit is of a fine crimson colour, covered with long subulate, soft bristles, whence the Malay name.

The flowers I examined appeared to be all hermaphrodite; so that a farther examination and revision of the generic character may be required.

HEXANDRIA.

COCOS, Schreb. No. 1692.

Cocos nucifera, Gmel. 2, 569. The Cocoa-nut. Malay, Clapa.

Several plantations have been formed on the Island, both on the inland plains, and on those near the sea, which have been cleared of mangroves and from the saltness of the soil are unfit for pepper. In the first of these situations, the trees are usually planted at the distance of four fathoms, or one hundred in an Oorlong; in the latter five fathoms, or sixty four. The price of planting by contract, which is the usual mode, is 350 dollars per thousand, for which they are to be taken care of for three years, or till the stems are, according to the Malay term, of the circumference of an elephant's head. The plants are furnished by the proprietor.

The trees are reckoned to produce 100 nuts each, and the net value of the crop, after deducting one third for charges of management &c., is estimated at one Spanish dollar each tree.

Areca, Schreb. 1696.

Areca catechu, Gmel. 2, 649. Roxb. Corom. 1, No. 75. Pinang. Mal.

Of this extensive plantations have been formed. It thrives well in all situations, on the sides of hills nearly as much as on the plain; and the cultivation of it is attended with little trouble. They are planted at the distance of six feet, or 1600 in an Oorlong. The price by contract is 350 dollars for 10,000, the contractor taking care of them for three years, in which time the trees are three cubits high. The net produce of 1,000 trees, deducting as before, is estimated at 132 dollars yearly. In seven years they are reckoned to be in full bearing.

MONADELPHIA.

Ricinus, Schreb. 1464.

Ricinus communis, Gmel. 2, 1074. I have only seen a few plants in gardens.

Aleurites, Schreb. 1472.

Aleurites triloba, Gmel. 2, 1035. Forst. Char. gen. p. 56, t. 56, Goertn. cent. 8, t. 125, f. 2. Camirium Rumph. 2,

P. 180, t. 58. Juglans camirium. Lour. ed. Willd. p. 702. Booa cras Mal. Marsd. Sum. p. 83.

Leaves scattered, cordate, sometimes three lobed, acuminate, the upper surface when young covered with a mealy dust, when older smooth ; having at the base two very small, round glands. Petioles a little shorter than the leaves. Panicles terminal, lax; peduncles scattered, dichotomous. Flowers small, white ; females solitary, almost sessile at the bifurications of the panicle ; males on each side two or three on foliform pedicels.

Male. Calyx three cleft; Cor: Petals five, oblong; Stam. 18-21 united into a column. Anthers with two distinct cells, laterally growing to the filaments. Female, as described by Schreber. From the seeds is expressed a mild oil, equal to that of the olive or almond.

DIOECIA—MONANDRIA.

MYRISTICA, Schreb. 1562.

1. *Myristica aromatica*, Swartz. prod. 96. *Myristica moschata.* Gmel. 2, 11. *Nux myristica.* Rump. 2, 14, t. 4. Muscadier. Sonn. New Guin. t. 116-118. The Nutmeg Tree. Pala, Mal.

Besides the extensive plantation belonging to the Honourable Company, several thousand trees are now on the estates of individuals, both European and Chinese. One nut was produced last year on Mr. Caunter's ground, by a tree, which including its growth before transplantation may be about ten years old. Though plucked before it was ripe, it had the true aroma of the best kind.

2. *Myristica oblonga ?*

The fruit is more oblong than either the *M. dactyloides* or *iryaghoedi* of Gaertner. t. 41, f. 2, and 4, but I did not examine the other parts sufficiently to establish a specific difference. Two trees grow near the Honourable Company's spice plantation. The fruit is ripe in June.

PANDANUS, Schreb. 1485.

Pandanus odoratissima, Gmel. 2, 12. Rumph. 4, t. 74-81
Makwhang, Mal. Planted for hedges.

PENTANDRIA.

CANARIUM, Schreb. 1516.

Canarium commune, Gmel. 2, 405. Rumph. 2, t. 47.

A considerable number of young trees, imported from the Moluccas are in the Honourable Company's, as well as in private plantations.

CANNABIS, Schreb. 1522.

Cannabis sativa, Gmel. 2, 457. Hemp.

Cultivated, as in Hindoostan, for the intoxicating quality of the leaves.

DECANDEIA.

CARICA, Schreb. 1536.

Carica papaya, Gmel. 2, p. 701.

Cultivated. It is not uncommon to see a few fruit on the male tree ; but they are not eatable.

POLYANDRIA.

SURUGADA, Roxb.

Gen. Char. " Male, calyx five leaved, corol three petaled Styles three ; Capsule tricoccous."

Surugada glabra, Roxb. (*Gelonium multiflorum*).

Found near the waterfall. Had fruit in May.

ROTTLERA.

Rottlera paniculata, Roxb. (*Mallotus cochinchinensis*).
20. *Ricinus dioicus ?* Forst. Fl. Austr. p. 67.

Stem: sub-arboreous; branches unarmed, nodding. Leaves: scattered, petioled ovate trapezoid (in young trees three lobed, acuminate, sub-peltate, repand above smooth, below hoary; marked at the base with two very small glands. Petioles slender, downy, spreading, drooping at the point; a little shorter than the leaves. Flowers small male and female on different trees. Panicles: terminal, diffuse; composed of spikes, scattered, interrupted. In the Male flowers: Calyx perianth three leaved; leaflets obovate. Corolla none. Stam: Filaments numerous, capillary, erect, the length of the calyx; beneath irregularly united into bundles; Anthers roundish, two lobed. In the Female flowers Calyx perianth five parted, leaflets lanceolate, very small, persistent. Corolla none. Pist: Germ irregular, muricated; Style hardly any; Stigmas three lacerated. Capsule tricoccous, muricated, three celled; two valved. Seeds solitary, roundish.

POLYGAMIA—MONOECIA.

MUSA, Schreb. 1653.

Musa Paradisiaca, Gmel. 2, 567, *M. sapientum.* Ibid.

The plantain or Banana. Pisang, Mal. This being a fruit highly esteemed, and in universal use the Malays enumerate an endless variety, each distinguished by a name, taken from the shape, colour, taste or some other quality of the fruit.

TERMINALIA, Schreb. 1583.

Terminalia catappa, Gmel, 2, 701. A few trees cultivated.

MIMOSA.

1. *Mimosa farnesiana.* Sown and planted for hedges.
2. *Mimosa pedunculata*, H. (*Parkia speciosa* Hassk.).

Arboreous, unarmed, leaves bipinnate, pinnae and leaflets many pair; peduncles terminal, solitary, very long. Pittay, Malay. M. biglobosa? Jacq. Amer. t. 179, f. 87.

Stem: arboreous, erect, tall, covered with a thick, rough bark. Branches: crowded towards the top of the stem, flexuous. Leaves: near the ends of the branches, scatterd, bipinnate; many paired (18-22) abrupt; pinnae many paired (22-36) abrupt; leaflets oblong, obliquely truncated, smooth, very much crowded, sessile. Petioles common, round, above, slightly; sprinkled with little rough points; much thicker at the base; above the base marked with an ovate, depressed smooth gland: partial filiform, thicker at the base, downy. Stipules none. Peduncles terminal, solitary, round, sprinkled with oblong, rough spots, longer than the leaves, nodding. Flowers aggregate, very much crowded, sessile, very small, of a whitish yellow, on a clubbed receptacle; forming an oval head about as large as an hen's egg. Bract an oblong, spathulate scale, beneath each floret, the length of the calyx, receiving the lower side of its tube. Hermaphrodite flowers the uppermost in the head (i. e. farthest from the peduncle, though as the flowers droop, this part in situ, becomes the lowest). Cal: Perianth tubular; mouth five cleft; segments, obtuse, the two undermost larger. Cor: Petals five, lanceolate, erect, coalescing with each other and with the cylinder of stamina; length of the Calyx. Stam: Filaments ten, longer than the Corolla, united into a cylinder for half their length; Anthers oblong, incumbent. Pist: Germ oblong, pedicelled; Style awl-shape, Stigma sharp. Legume oblong, pointed, compressed, subfoliaceous interrupted with isthmi. Seeds: many, oval, compressed, surrounded with a fleshy pulp. Male flowers below the hermaphrodite, shorter, forming a neck between the head of hermaphrodite flowers and a smaller one below yellow.

Calyx and Corolla as in the hermaphrodites. Stamens filaments as in the hermaphrodites; only their sheath is wrinkled within. Anthers as in the hermaphrodite. Neuter flowers below the male, forming a smaller head, whites. Calyx and Corolla as in the hermaphrodites. Stam: Filament as in the hermaphrodites, but much longer and flexuous. Anthers none. Pist: A very short cylindrical rudiment, in the bottom of the tube.

Flowers in May and December. The Malays are very fond of the seeds, which taste something like garlic, and of the pulp which surrounds them.

3. *Mimosa ? articulata*, H. (*Pithecolobium lobatum*).

Arboreous, leaves bipinnate, conjugate with leaflets three pair; Legumes articulated, curved, unilateral.

Stem: Arboreous, small, crooked. Branches: numerous, irregularly spreading. Leaves: scattered, bipinnate, abruptly conjugate, pinnae abruptly three paired; leaflets ovate, pointed, smooth. Peduncle: lateral, short; bearing from one to three Legumes, jointed, much curved, joints adhering laterally to the peduncle, which runs along the concave side of the curve; the outer side of the joints rounded, with deep notches between. Seeds: one in each joint, roundish, compressed. Not having seen the flowers the genus is doubtful.

The joints of the Legumes are sold in the Market under the name of Choorin, (Jering) the Malays being fond of the seeds, which have an astringent taste.

Ficus, Schreb. 1613.

1. *Ficus lobata*, H.

Leaves sparse, long petioled, cordate, five lobed, subserrate, smooth above, tomentose below. Found near the waterfall.

2. *Ficus malaica*, H.

Leaves elliptic, pointed, most entire, smooth; Fruits axillary, in pairs, sessile, ovate. (Neither sufficiently well described to identify).

CRYPTOGAMIA—FILICES

Acrostichum, Schreb.

Smith Tracts, p. 230. "Fructifications forming one continued spot of no determined figure occupying almost all the disc of the leaf. Involucrum none, except little scales or hairs interspersed among the capsules."

1. *Acrostichum aureum,* Gmel. 2, 1295.

"Pinnas alternate, tongue-shaped, quite entire smooth" Petiv. fil. 142, t. 8, f. 5. Plum. fil, 87, t. 104, Amer. 5, t. 7, Pluk. Alm. 2, 288. f. 2. Found in thickets of underwood; and by the road side.

2. *Acrostichum calamarium,* H. (*Gleichenia* sp.).

Frond dichotomous, bipinnate, tendril bearing; leaflets linear, entire, parellel. Compare. *Acrostichum furcatum* Linn. Gmel. 2, 1296. Pium. Amer. 13, t. 20, Tel. 22, t. 28. Petiv. fil. 51, t. 5, f. 4. Polypodium dichotomum. Swartz. Prod. 133. Thumb. jap. 338, t. 37. Filix calamaria. Rumph. 6, 85, t. 38. Stipe; round, smooth, suffruticose, pithy, terminating with a tendril. Frond: dichotomous, bipinnate; leaflets opposite nearly joined at the base, linear, entire, smooth. The stipe grows to a length of twelve or fourteen feet. It is first erect, but as it lengthens, it falls down, and runs along the ground. Having the structure of a reed, it is used by the natives to make writing pens. Grows on the hill.

The description given by Rumphius of his Filix calamaria agrees with mine in many respects; but in his figure, the leaflets are more completely united at the base and broader in proportion to their length; his fronds are not so regulary dichotomus throughout; and he has a long portion of naked stipe between the subdivisions of the fronds, which do not occur in mine.

The *Acrostichum fucatum* of Linneus (*Polypodium dichotomum* of Swartz. and Thunberg) as far as I can judge from the figure of Thunberg, differs from mine in nearly the same particulars as that of Rumphius. And in my plant the fructifications cover the whole lower surfaces of the pinnae, constituting a true Acrostichum.

POLYPODIUM, Schreb. 1632.

Smith, Tracts p. 231. "Fructifications in roundish, scattered, not marginal spots. Involucrum umbilicated, separating on almost every side."

1. *Polypodium phyllitidis ?* Gmel. 2. 1305. (Probably *Thamnopteris Nidus-avis* L.).

"Fronds lanceolate, smooth, most entire, fructifications scattered."

Root: fibrous. Stipes: several, columnar, furnished with many lanceolate, caducous scales. Frond: simple, undivided, lanceolate, pointed, most entire; smooth; with veins below, opposite parallel, spreading. Fructifications: crowded.

2. *Polypodium ; an tenellum*, Gmel. 2, 1310.

"Fronds pinnate, leaflets alternate, remote, linear, acuminate, waved." Forst. Prod. N. 440.

Root: fibrous. Fronds: numerous, about a yard in height, lanceolate, pinnate. Stipe near the base furrowed in front, higher up cylindrical; eight or nine inches of the lower part bare. Pinnae: alternate, remote, linear, acute, most entire, smooth; the upper smaller. Fructifications: scattered; generally in four rows, two on each side of the nerve.

The trivial name given by Forster does not suit my plant, which is pretty strong. Therefore I suspect they are distinct species.

HEMIONITIS, Smith p. 235.

"Fructifications in scattered branching lines each of them double, with a vein running between."

"Involucra originating from the vein, and each separating outwards."

Hemionitis pinnatifida, H.

Frond pinnated, lanceolate; pinnae alternate, lance linear, pointed, pinnatifid; segments spatulate, obtuse, approximate.

I think the generality of the involucra open on both sides, the vein running up the middle; and therefore have placed it under this genus. But in several instances they appear to be attached laterally to the vein, and open on one side only viz., that which is remote from the vein, which is toward the nerve or margin, according as the fructification is on the inner or outer side of the vein. This having been noticed in the dried specimen, I suspect it has happened from one side of the fructification having dropped off.

BLECHNUM, Schreb. 1627.

Smith, p. 237. "Fructification in longitudinal uninterrupted lines, close to the nerve.

"Involucrum originating from the surface, continued, separating towards the nerve."

1. *Blechnum petiolatum*, H.

Fronds: pinnated, pinnae lance linear, blunt petioled. Stipe: erect, smooth; behind convex, infront furrowed. Frond: pinnated; pinnae nearly opposite; five pairs with an odd one, lance linear, blunt, most entire, smooth, petioled. Petioles: short, slender, round below, furrowed above. Fructifications: in two lines, nearly parallel one on each side of the nerve, but remote from it.

2. *Blechnum orientale?* Gmel. 2, 1300. Reich. 4, 398. Osbeck voyage.

Agrees with Osbeck's description, except that the pinnae are often much longer than he mentions, being seven or eight inches in length.

3. *Blechnum longifolium*, H.

Frond pinnated; pinnae alternate, remote, broad linear, most entire, smooth.

Stipe: slender, erect, furrowed on both sides. Frond: pinnated, pinnae alternate, remote, sessile, sub-decurrent, broad linear, most entire, smooth, spreading, about a foot in length. Fructifications: close to the nerve on both sides.

DAVALLIA, Smith p. 245.

"Fructifications in roundish separate spots near the margin. Involucra like scales, from the surface distinct separating outwards."

Davallia multiflora, Roxb.

"Fronds linear lanceolate; pinnae alternate; anterior angle of the truncated base enlarged."

Found on the hill.

OPHIOGLOSSUM, Schreb. 1621.

1. *Ophioglossum scandens*, Gmel. 1291. Hort. Mal. t. 33.

2. Smaller than the former, but resembles it so nearly as to make rather a variety than a distinct species. Both found near the waterfall.

LYCOPODIUM, Schreb. 1615.

Of this I have six distinct species, but the only two that I am able to ascertain with much probability are.

1. *Lycopodium cernuum*, Gmel. 2, 1289. Reich. 4, p. 444.

Of the figures quoted to this species the following agree best with mine; Pluk. Alm. t. 431, f. 3. Moris. hist. 3, p. 624, Sect. 15, t. 5, f. 6. Bellan Patsja. Hort. Mal. 12, p. 73, t. 39.

2. *Lycopodium ornithopodioides ?* Gmel. 2, 1290, Reich. 4, 447. Dillen. t. 67, f. 1, B.